

The Chemical Age

A Weekly Journal Devoted to Industrial and Engineering Chemistry

VOL. XXXVII.

July 24, 1937

No. 943

The Oil From Coal Debate

THE diligent researches of the chemist, combined with the initiative of Messrs. Imperial Chemical Industries, Ltd., have caused the home production of fuel and lubricating oils to become the business of the chemical industry. The Mother of Parliaments has for many years kept an anxious, one had nearly said "grandmotherly," eye upon what is going on in this direction, but without giving any positive assistance other than the imposition of the hydrocarbon tax, and subsidising a little research work through the grant given to maintain the Fuel Research Station. In view of what is being done elsewhere in the way of national defence, it is strange that more positive steps have not been taken. A debate upon the subject recently took place in the House of Lords, which was summarised in our columns last week, upon a motion introduced by Lord Mottistone that plant for the production of oil from coal should be set up in the depressed areas. In the course of his opening speech, Lord Mottistone made in particular one highly pertinent remark. It was, he said, a moonbeam from the larger lunacy to spend £1,500,000,000 on defence—and mostly on weapons dependent on oil—and take no steps to get home-produced oil. That sentence contains the root of the matter. At the present time there is no economic method by which we can produce anything like our requirements of oil synthetically from coal or from any other material at a price which can approach the c.i.f. price of imported petroleum. In a peaceable world, in a sensible world in which tariffs were not imposed to act as trade barriers, there would be no justification *at present* for the home production of oil save as a by-product from processes more important commercially. But the world is neither peaceable nor sensible, and if we are to protect ourselves against aggression we must safeguard our fuel supplies. It is necessary that as a nation we should remember the fate of the mighty Achilles, dipped by his mother, Thetis, in the waters which rendered him invincible—all save the heel by which she held him. Is oil to be our Achilles' Heel?

The economic facts of the production of oil from coal are simple, but they are frequently unknown to those who discuss the subject publicly. Oil can be produced as a by-product of coal carbonisation or by synthetic processes. In 1934, to take a concrete instance, we used 8,436,000 tons of total fuel oils, including petrol. It has been calculated by an eminent fuel technologist that if we found a use for the coke produced—and this is an essential condition for financial stability—we could not hope to produce as a maximum more than some 4,600,000 tons of oil by carbonisation, and at least half of this would consist of pitch that would require treatment before use in the internal combustion engine. Taking into account the other uses for tar, such as for road surfacing, it is cal-

culated that we could produce only about 2,000,000 tons suitable for the internal combustion engine, and although this might be 25 per cent. of our 1934 requirements, it would probably not be much more than 10 per cent. of our war-time requirements. Obviously, whilst carbonisation should not be neglected, it is impossible to place any reliance upon these possibilities, which cannot be fulfilled until raw coal is replaced by coke or semi-coke in the home.

Clearly, we must fall back upon the synthetic production of oil. Lord McGowan in the debate in the House of Lords agreed that although the I.C.I. hydrogenation process was to-day a successful operation, "it did not, even with the protection afforded by the Hydrocarbon Oils Production Act, present a favourable opportunity for the investment of large sums of private capital." He added that to produce sufficient oil to meet our home needs would be "out of the realm of private initiative and in the sphere of national policy." That is a clear statement of the position of hydrogenation. There remains the other great process—the Fischer-Tropsch. This is the catalytic conversion of a mixture of gases, $2H_2 + CO$, into oils, in which it is very important to note that oils eminently suitable for chemical conversion into lubricating oils are produced—oils which appear to be produced by no other process. So much store is placed upon this process in Germany that a military permit is necessary for those who desire to visit the works. Yet, although the process is at present open to be erected in this country, no move has been made by the Government to erect a Fischer-Tropsch plant. It is striking commentary on the way we conduct public affairs that the Government spokesman could only say in regard to this process that it was remarkable, but that "whether it was suitable for our coal or not, he could not say!" Any coke of adequate size can be used for the production of water gas, and thus any coal which will produce coke—and some that will not—can be used for this process. I.C.I. and the Fuel Research Board are amassing information regarding the hydrogenation process. It is high time that another chemical group was developing the Fischer-Tropsch process in this country. Lord McGowan produced one of the most telling arguments in favour of that course when he said that industrial experience in manufacturing processes over a period of years always led to improvements which resulted in the reduction of costs of manufacture; this might well change the whole position of synthetic oil production, but it cannot eventuate unless the chemists of this country are given the opportunity to engage in practical manufacture over a period of years. It certainly seems from developments abroad that other countries are favouring the Fischer-Tropsch process. Is it not time that we took some positive steps in that direction?

Notes and Comments

Special Area Industries

THE special areas of South Wales, Durham and Tyneside, and West Cumberland, are to provide employment for an additional 10,500 people through the establishment of new industries and the extension of existing undertakings in the areas. This desirable state of affairs is to be reached by a total expenditure which is estimated at slightly more than £3,500,000; the capital for this work of economic reconstruction being provided by four sources—Lord Nuffield's Trust, the Special Areas Reconstruction Association, loans under the Special Areas (Amendment) Act, 1937, and private enterprise. The actual grants from the three funds mentioned will total rather more than £2,000,000, and the remaining £1,500,000 will be supplied by private enterprise, namely, by the promoters of the new undertakings themselves. It is obvious, therefore, that the industries, which are to be founded or extended, are looked upon favourably by business men, who, in addition, have the further satisfaction of knowing that they are giving regular employment to men who are without work, and who have been so for long periods in some cases.

Scientific Progress and the State

THE U.S. National Resources Committee has issued a report on scientific progress and its effect on national policy, which points out that technical developments will have widespread effects on economic and social relationships unless these are adjusted in advance. The committee hopes that it can anticipate some of the effects of the major developments and make plans to meet the new situations that will arise as these scientific advances come into widespread use. Among the advances forecast by the committee, and which are considered to have the most profound social significance, are plastics, artificial cotton and wool from cellulose, synthetic rubber, petrol from coal, air-conditioning equipment, and tray agriculture. Although the social changes brought about by scientific progress cannot be eliminated, the time interval between development and complete application of an invention is often one of unsound social and economic structure, which can be rectified by adequate planning. This is an enterprising effort which will undoubtedly help American national life to run smoothly in the future. Such a scheme would not be without benefit in this country, and in the Department of Scientific and Industrial Research we already have an organisation admirably fitted to make advisory forecasts of technical progress.

Increase in Factory Accidents

A SUBSTANTIAL increase in accidents during the past year is recorded in the annual report of Mr. D. R. Wilson, Chief Inspector of Factories and Workshops, who states that during times of prosperity longer hours of work and greater speed of production occur, more inexperienced young workers and more previously unemployed workers, long out of practice, are absorbed, and new machinery with unknown risks is installed. He is of the opinion that a rising toll of death and injury must still be regarded as a penalty to be paid for increased prosperity. The conclusion is inevitable that too often immediate production is the

main, if not the only consideration, with the result that the question of safeguarding is left to the last and machines are put into use before proper fencing has been provided. This is a strong criticism of the works management, to whom the protection of the worker should always receive first consideration. The safety of the workers, especially the young, is a definite responsibility of the employer, who should feel that any serious accident in his works is damaging to his reputation. In addition to adequately protected machinery in good order, the number of accidents can be further minimised by personal supervision. This is an important factor and cannot be satisfactorily replaced by any number of warning notices posted throughout the works.

Patent Protection

THE granting of a patent is fundamentally the outcome of a bargain made between the inventor and the public, whereby the inventor receives the sole monopoly of working his invention for a certain period of years in exchange for publishing the details of his invention in full so that it may become public property after the expiration of his monopoly. In order that the patentee may derive the full benefit from his monopoly, it is naturally essential that any acts of infringement should be rapidly detected and dealt with. In the case of the invention of a new chemical product, acts of infringement are easily brought to light by the appearance of the product on the market. With inventions which are concerned with a novel process for manufacturing an old product, there is no outward sign whatever that infringement of the patent rights is taking place, and accordingly detection is not simple and often impossible. The value of patented inventions of this nature probably resides in the fact that the letters patent themselves act as a most powerful deterrent to would-be infringers, and this is confirmed by the large numbers of "blocking" patents published, the main function of which is to prevent the public from working the process although the inventor himself has no intention of doing so.

Handling Ether

ETHER has such wide applications in the laboratory and works and is consequently in almost everyday use, that familiarity is very apt to breed contempt of the precautions necessary to its safe handling. The current issue of the *Industrial Safety Bulletin* reminds the reader that between one and sixteen per cent. by volume of ether vapour will produce an explosive mixture with air and danger is increased by the relatively small diffusion velocity of the vapour which allows a dangerous concentration to remain for a considerable time. Further, ether reacts with oxygen to form peroxides, an accumulation of which can in the long run lead to dangerous explosions. It is advisable to store ether in opaque bottles and tests for the presence of peroxides should preferably be applied before the ether is put into use. Most satisfactory distillation is by direct or indirect heating with steam. Inhalation of the vapour must, of course, be avoided. This is best achieved by means of enclosed apparatus and well-ventilated workrooms.

Safety and Health in Industry

Annual Report of the Chief Inspector of Factories

THE year 1936 has been one of widespread industrial revival, although at the end of the year certain areas had little or no share in the return of prosperity, states the *Annual Report of the Chief Inspector of Factories and Workshops for 1936*. This activity has not been confined to such busy centres as the London area, Birmingham, Leicester and Luton, but there has been a revival in districts which were in a state of depression only a short time ago. The efforts of the local and regional industrial development bodies which have been formed in many parts of the country in recent years have resulted in numerous moderate sized factories producing a wide variety of goods. This widening of the range of economic activity in districts which in the past have relied mainly on one or two staple industries is tending to minimise the local effects on employment of the general depression in those industries.

The Factories Bill

The Factories Bill "to consolidate with amendments, the Factory and Workshop Acts, 1901 to 1929, and other enactments relating to factories," was introduced into Parliament early in the current year, and has passed the Report Stage in the House of Commons. During the year under review two Acts directly concerning the Factory Department were passed. One (Employment of Women and Young Persons Act, 1936) places on a permanent basis, with some amendment and with improved safeguards, the temporary provisions in the Employment of Women and Young Persons Act, 1920 (which have hitherto been continued under the Expiring Laws Continuance Act).

In accordance with the procedure laid down in Section 79 of the Factory and Workshop Act of 1901, draft Regulations dealing with the use of Kiers in Print Works, Bleaching and Dyeing Works and in Bleaching of Cotton or Cotton Waste were issued on December 30. In addition two Orders were made by the Secretary of State. The one applies, as from August 1, 1936, the provisions of Section 73 of the Factory and Workshops Act, 1901 (requiring the notification of certain diseases) to all cases of manganese poisoning occurring in a factory or workshop. The other, made under Section 1(2) of The Employment of Women and Young Persons Act, 1936, prescribes (as from January 1, 1937) the manner in which workpeople are to be consulted before authorisation is given to employ women and young persons of sixteen and over on the two-shift system.

At the end of the year reviewed there were 166,866 factories and 75,153 workshops on the registers of the department, being an increase of 2,589 factories and a decrease of 4,086 workshops as compared with 1936. The number of premises of all kinds subject to inspection was 278,157. Complaints received during the year numbered 3,981. The subjects of these complaints amounted to 5,415 of which 768 concerned matters outside the department's jurisdiction; most of the remaining 4,647 related to hours of employment, ventilation, sanitation and temperature and 51 per cent. of these were substantiated upon enquiry. Genuine complaints afford very valuable aid to inspectors in enabling them to detect and rectify irregularities.

Accidents

The total number of accidents reported was 176,390, of which 920 were fatal, an increase of approximately 18 per cent. and 9 per cent. respectively over the corresponding figures of 149,696 and 843 for 1935. The increase was spread over practically every district, though in varying degree. Thus, in a London area it was 12 per cent., in Sheffield 25 per cent., Middlesbrough 35 per cent., Glasgow 36 per cent., Lanarkshire 40 per cent. and Gateshead 50 per cent.

The prevention of accidents at transmission machinery or

"millgearing" is a subject to which inspectors have for years given special attention, both by verbal instruction and distribution of the official precautionary leaflets. Accounts of distressing fatalities appear from time to time in the Press, prosecutions have been taken with fair regularity, Safety Committees have discussed the matter and posters have been exhibited, yet driving belts and revolving shafts continue to take their grim toll. Most employers and persons in charge appear to be aware of the danger, but while substantial progress has been made in fencing and exhibiting rules forbidding approach to millgearing in motion, there is still much to be done. Idle belts are quite commonly seen hanging loosely upon revolving shafting where belt perches or hangers should have been provided for safe support, comparatively few machine belt-mounting appliances are in use and belt-mounting poles are viewed with suspicion by workpeople.

Explosives

Amongst the explosions there was a considerable number of the usual type associated with the use of coal gas, acetylene and steam. The explosion of an economiser caused the deaths of four persons and injuries to four others. Inquiry showed that it was due to the failure of the foreman mechanic to close the flue damper after the water inlet and outlet valves had been shut, the economiser thus becoming a closed vessel in which steam ultimately was generated. Several explosions of compressed air vessels revealed the necessity of the requirements set out in the Factories Bill as to testing, fitting of safety valves and periodic inspection. The risk of using a flame or of conducting a heat process in proximity to a vessel containing inflammable vapour was once again demonstrated by an explosion at a tar distillery when a worker attempted to weld the flange on a tar cooler. Four men were killed.

The incidence of accidents to young workers under 18 engaged in industrial occupations has been under observation during the past few years, and it has been noticed with concern that the number of accidents reported under the Acts has continued to have an upward tendency, not altogether connected with trade fluctuations, which, under varying conditions, may provide employment for a larger number of young workers at one period than at another. At the commencement of the year under review the matter had assumed an importance demanding special and immediate attention, and steps were taken to ascertain the causes influencing the increased accident rate and to consider the application of any remedial measures necessary and practicable. In common with many aspects of safety in industry, the question as it applies to young workers presents its own problems, ranging from psychological considerations in the individual boy or girl to the machinery, plant, devices and practices at or among which he or she may work, with their points of potential danger often more real than apparent to the inexperienced. Large numbers of the reported accidents were closely investigated, special attention being given to factories where the number of accidents was unduly high, and widely differing trades from shipbuilding to the making of spectacle lenses have been considered.

Reports show that the number of accidents occurring to young workers could undoubtedly be very considerably reduced by the application of suitable methods and appropriate treatment of the subject. Although the qualities inherent in youth which may be contributory to some accidents cannot be eradicated from human nature, they can be controlled where necessary for safety by wise treatment. These are the services to youth which can be given by all employers of young labour.

Particulars of the notification of industrial poisoning or disease under Section 73 of the Factory and Workshop Act, 1901, and under Section 3 of the Lead Paint (Protection against

Poisoning) Act, allowing comparison with previous years, are given below :—

Disease and Industries.	Reported Cases.				
	1936.	1935.	1934.	1930.	1930.
Lead Poisoning	103 ¹³	168 ¹⁷	198 ²⁵	265 ³²	289 ⁴⁴
1. Smelting of metals ..	19	17	20 ¹	37 ¹	45 ³
2. White and red lead works ..	5 ¹	7	7	3 ¹	28
3. Vitreous enamelling ..	5	1	8	2	2
4. Paint and colour works ..	19	21	19 ¹	6	9
5. Indiarubber works ..	1	—	—	3 ¹	7
Phosphorus poisoning ..	—	—	—	—	—
Mercurial poisoning ..	—	1	—	3	5
Arsenical poisoning ..	1 ¹	1	3	1	3
Manganese poisoning ..	—	—	—	—	—
Carbon bisulphide poisoning ..	—	1	1	—	—
Aniline poisoning ..	7 ¹	9	9	24	—
Chronic benzene poisoning ..	1 ¹	—	2 ²	—	—
Epitheliomatous Ulceration ..	142 ²⁷	171 ³⁸	170 ⁴⁵	194 ³⁶	45 ¹
1. Pitch	56 ¹	56 ³	57 ²	44 ¹	32
2. Tar	37 ¹¹	45 ¹²	45 ¹⁶	53 ⁹	10 ¹
3. Paraffin	3	3 ²	—	—	3
4. Oil	46 ¹⁵	67 ²¹	68 ²⁷	97 ²⁶	—
Chrome Ulceration ..	84	67	87	95	126
1. Manufacture of bichromates	1	—	1	6	77
2. Dyeing and finishing ..	6	7	7	15	43
3. Chrome tanning ..	7	6	5	5	4
4. Chromium plating ..	66	48	71	57	—
5. Other industries ..	4	6	3	12	2

The principal figures relate to cases, the raised figures to deaths. Fatal cases not reported in previous years are included as both cases and deaths.

Specific Poisoning Cases

The number of cases of lead poisoning reported is the lowest on record, though a few more cases have occurred in electric accumulator works. The reduction in the number of cases in the painting of buildings is satisfactory. Diminution in severity of all cases notified continues; under 15 per cent. of the cases were described as severe as compared with just under 24 per cent. in 1931. No case of mercurial poisoning was reported, but my attention was drawn to a small factory where one man handling a mercurial preparation in the process of seed dressing showed symptoms of mild mercurialism, due to lack of dust-control.

One case (fatal) of arsenical poisoning associated with neuritis occurred during the year in a foreman, aged 57, who had been employed for 42 years in the manufacture of sodium arsenite for use as an insecticide, during which time he was liable to come into contact with an appreciable amount of arsenical dust, especially when grinding.

Seven cases of aniline poisoning were reported, one being fatal. The fatal case was that of a man employed in a store-room, who, before starting work on the date on which he was affected, had felt vaguely unwell. He had handled on the previous day a variety of substances including paranitraniline, alpha-naphthylamine, aniline oil and orthotoluidine. On the day on which he became ill, he had handled betanaphthol and paranitraniline. The deceased man appeared ill within an hour of starting work, but worked for hours before he was persuaded to attend at the ambulance room for treatment where he collapsed. He was taken to hospital critically ill and died on the same day. Investigation at the man's place of work yielded no evidence of unusual spillage of dangerous materials, and no one else had been affected. It appeared, however, that there was considerable laxity in handling dangerous products and stricter supervision by the firm for this class of work was called for. The six other cases of aniline poisoning occurred in making intermediates (D.N.B., D.N.T.) 3, parachloraniline 1, 5-chlorortho-toluidine 1, and aniline black dyeing 1.

A fatal case of aplastic anaemia occurred after six weeks' total incapacity in a works manager, aged 45, who had been exposed up to three months previously to solutions containing benzol used in the manufacture of artificial leather cloth. He had been employed in three factories making similar material for 30 years, and at one of these where he had personally carried out much experimental work the percentage of benzol in the solution was known to be about 45.

Thirty cases of anthrax have been reported, but only one of them proved fatal; wool, horsehair, and hides and skins were responsible.

The increase in the number of cases of chrome ulceration notified is again due to chromium plating. Anodic oxidation, printing and engraving, and manufacture of colours and dyes were responsible for three of the four cases in "other industries." The distribution of cases of epitheliomatous ulceration in relation to the causative agent and industry is given in the following table :—

Causative Agent and Industry.	1936.	1935.	1934.	1933.	1932.
Pitch and tar :—
Patent fuel works	31	27 ²	25 ¹	32 ¹
Tar distilling	42 ⁴	48 ³	50 ²	39 ²
Gas Works	13 ⁶	19 ⁷	22 ¹⁴	16 ⁹
Other Industries	7 ²	7 ³	5 ¹	7 ¹
Paraffin :—
Shale oil works	3	3 ²	—	3 ¹
Mineral oil :—
Cotton mule spinning	41 ¹²	62 ²⁰	61 ²⁴	39 ²³
Other industries	5 ³	5 ¹	7 ³	7 ³
Total	142 ²⁷	171 ³⁸	170 ⁴⁵	143 ⁴⁰

The principal figures relate to cases; the raised figures to deaths.

Cases of Gassing

The reported cases of gassing are given in the following table :—

	1936.	1935.	1934.	1933.	1932.
Carbon monoxide :—
(a) Blast furnace	26 ⁵	11 ²	23 ⁴	7 ¹
(b) Power	19 ¹	22 ²	28 ¹	31 ¹
(c) Coal	14 ¹	10 ¹	15 ¹	13 ¹
(d) Other	27 ¹	13 ²	19 ¹	29 ³
Carbon dioxide	—	—	—	5 ¹
Sulphuretted hydrogen	5	9 ²	2	3 ²
Sulphur dioxide	1	5	1	5
Chlorine	7	8	14	13
Nitrous fumes	6	7 ¹	17 ¹	—
Ammonia	3	3	18 ¹¹	3
Benzol	3 ¹	2	—	—
Naphtha	3	—	1	1
Petrol and benzine	—	3 ¹	4	1
Trichlorethylene	8 ¹	7 ¹	10	1
Nickel carbonyl	8	6	4	23 ¹
Phosgene	2	1	3 ¹	—
Hydrochloric acid	1	—	—	—
Hydrocyanic acid	—	1	—	1 ¹
Bitumen, creosote, tar, oil	—	—	1	2
Other	26 ²	12 ¹	19 ¹	11
Total	153 ¹²	120 ¹³	179 ²¹	149 ¹⁴

The principal figures relate to cases; the raised figures to deaths.

In comparison with the previous year there is a definite increase in the number of cases of gassing due to carbon monoxide, especially from blast furnace gas. Attention must be drawn to the fact that twelve of the twenty-seven cases due to other than blast furnace, power, or coal gas were caused by escape from coke rivet fires in confined spaces on board ship.

Sulphuretted Hydrogen Gassing

During the year there were five cases of gassing by sulphuretted hydrogen. Two (moderately severe) occurred simultaneously in a chemical works principally engaged in the manufacture of phosphoric acid, when dearsenicating the acid with sodium sulphide under circumstances not likely to be repeated. Escape of gas while repairing a steam joint on a sulphur lute in a chemical works, emptying spent oxide from purifier boxes in a gas works, and escape from a pot in which polysulphides were being made at a chemical works were responsible for the other three, only in the last case the symptoms being severe with temporary loss of consciousness. The attention of the Senior Medical Inspector was also directed to a new process in which sulphuretted hydrogen is evolved with possibility of poisoning by this gas, the process in question being the manufacture of foam slag used for building purposes.

The six cases of nitrous fume poisoning were due to escape from a storage tank containing a mixture of nitrous vitriol heated by a steam ejector, cleaning out a vitriol chamber with powdered lime, cleaning out a nitric acid tank, etching copper covered rollers (the ventilating system having broken down

through corrosion), nitrating paper cellulose—a similar process to that which caused a fatality in the previous year, and dipping metallic articles into a solution of nitric acid. This last exemplifies the necessity of mechanical removal of the fumes generated in dipping metallic articles in nitric acid solution, even when the operation is carried on in the open air.

The three cases of poisoning from benzol were due to cleaning the inside of tanks. In two (one of which was fatal) the work consisted of removing scale from the inside of a tank wagon which had previously been used solely for the carriage of crude benzol. Two cases occurred from the accidental spillage of liquid phosgene, following the fracture of an old, corroded pipe, both men being liberally splashed with the liquid.

Nicotine Poisoning

Attention is drawn to the occurrence of fairly severe nicotine poisoning in two men who had been engaged for an hour or two on one occasion in preparing a nicotine-talc insecticide powder. Although they wore suitable protective clothing, gloves and dust-respirators, both suffered from severe headache, giddiness, vomiting, diarrhoea and mental confusion. The symptoms persisted for several hours, and for a few days subsequently both men felt generally unfit and suffered from marked anorexia. Of the 20 other gassing cases, four were due to zinc fume, of which three were from oxyacetylene cutting of galvanised metal and four from fume during riveting in a tank or confined space on board ship. Dipping condenser parts into a tank containing a mixture of ethylene dichloride and lanoline affected one man and caused vomiting and abdominal pain. Fumes from burning oily waste, from painting with paint containing a mixture of petroleum, from sulphur chloride, and from paraffin were the main causes of the other cases.

Sixty-four deaths from silicosis and sixty-two from silicosis and tuberculosis came to the knowledge of the department

during the year, together with 7 deaths from asbestosis and 4 from asbestosis and tuberculosis. It has been noted from the information received concerning deaths alleged to be due to silicosis that the post-mortem examination has sometimes revealed no trace of silicosis even after employment for many years in occupations which have produced many cases of silicosis. Since 1930, out of 189 such cases no evidence of silicosis was found in 122 and only very slight traces of silicosis in 67.

Dermatitis

The number of voluntarily reported cases of dermatitis reached the highest figure yet recorded—1,771 (1,429 in 1935). There is an indication that suitable measures for protection are becoming more widely known. The number and use of preparations—"barrier substances"—designed for the protection of the skin when exposed to irritants, has increased. The importance of frequent and careful inspection of the hands in the control of industrial dermatitis needs again to be emphasised.

The demand in certain branches of industry for a coating substance which is fire-resisting and waterproof is responsible for the extended use of chlorinated naphthalene waxes with a low co-efficient of expansion. That these waxes affect the skin adversely has been realised for a number of years, and while the chlorine content has been assumed to be chiefly, if not entirely, responsible for the irritant action, it has been recognised that the type of skin reaction to the chlorinated naphthalene waxes was not identical with the typical "chlorine acne."

In the larger factories, particularly, the standard of first aid is slowly improving. An increasing number of employers are realising the advantages derived from the provision of a suitable ambulance room in charge of a trained attendant, and competitions in team work inaugurated by local councils of the National Safety First Association have done a great deal to stimulate still further the general interest in first aid.

American Chemical Society

Twenty-Three Symposia at Forthcoming Meeting

TWENTY-THREE symposia will be held in connection with the 94th meeting of the American Chemical Society at Rochester, N.Y., September 6 to 10. Mr. Florus R. Baxter, retired head of the Vacuum Oil Co.'s research laboratories, will be honorary chairman; M. H. Eisenhart, president of the Bausch and Lomb Optical Co., will be general chairman. Dr. E. R. Weidlein, director of Mellon Institute of Industrial Research, Pittsburgh, will deliver the annual presidential address of the Society.

Artificial radioactivity and its chemical uses, studies of the chemistry of the earth's crust, low temperature methods and research, chemical microscopy, quantitative spectroscopic analysis, and photography will be among the session topics of the Division of Physical and Inorganic Chemistry. The National Research Council's Insulation Committee will collaborate with a symposium on the chemistry and physics of electrical insulation. Medicinal patents, vitamins, and the chemistry and metabolism of fats will be considered by the Divisions of Agricultural and Food, Medicinal, and Biological Chemistry. The Cellulose Division will emphasise research on cellulose derivatives, while the Paint and Varnish Division will feature organic plastics. The Industrial and Engineering Chemistry Division will hold half-day symposia on "unit processes" and "automatic control." The characteristic properties and chemical utilisation of hydrocarbons will be the chief subjects of the Petroleum Division. Two days will be devoted by the Gas and Fuel Division to "gaseous combustion," during which will be covered the kinetics of ignition, flame propagation, inflammation limits, and the like, while

Zinc Corporation Extensions

Capacity to be 730,000 tons per year

AN important development programme was announced by Viscount Horne, chairman of Zinc Corporation, Ltd., at a meeting of the company held in London on July 21.

In 1927, said Viscount Horne, the output was 260,000 tons, by 1930 it was raised to about 335,000 tons, and in 1935 to over 375,000 tons per annum. Next year the capacity of the mine to produce, and the mill to treat, will be approximately 440,000 tons; in 1939 550,000 tons, in 1940 680,000 tons, and thereafter 730,000 tons per annum. While the mine will be opened up to produce and the plant extended to treat largely increased tonnages, the actual output in the future will be governed by the industrial and commercial conditions then ruling. Expenditure on this expansion programme will not involve the raising of any additional capital or any interference with dividends.

The results of the efforts of the company's metallurgical staff are shown by the further improvement in the already high recoveries of lead, silver and zinc. An improvement is also shown in the grade of the lead concentrate. The work done at the Port Pirie plant of the Broken Hill Associated Smelters continues to be highly satisfactory. These smelters are now running to capacity, producing approximately 200,000 tons of lead and 8 to 10 million ounces of silver annually.

Papers to be heard at other divisional sessions, include investigations dealing with sugar, rubber, water, sewage, and sanitation, microchemistry, organic chemistry, fertilisers, and colloids. A symposium on chemical engineering education will be sponsored by the Chemical Education Division.

Pigments, Lakes and Other Colouring Materials in Plastics

By

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THE appearance of a plastic article is one of the important incentives to its use. As a consequence the obtaining of decorative effects assumes great importance. The proper selection of colouring materials to obtain various tints and shades of colour, and the combination of two or more colours of plastics to produce mottled effects and designs, together with suitable methods of accomplishing the incorporation of the colours into the plastic, constitute a large portion of the problem of the plastics manufacturer.

The general subject of colouring plastics has been treated by Peacock and Kienle (2). The purpose of this paper is to discuss briefly the colour problems confronting the pyroxylin plastics manufacturer, with brief comments on cellulose acetate and methyl methacrylate.

By pyroxylin plastics are meant those which are known in the trade as "Pyralin," "Celluloid," "Fiberloid," "Nixonoid," and the like, sold generally in the form of sheets, rods, and tubes.

Manufacturing Operations

In order to present the problems of the colourist in the pyroxylin plastic field properly, it is necessary first to outline the various steps in the process of producing these plastics (3).

The pyroxylin used in the manufacture of plastics is usually nitrated to a nitrogen content of about 11 per cent., corresponding approximately to the dinitrate. This variety of pyroxylin yields plastics of better toughness than the higher nitrates without any serious decrease in water resistance. Camphor is generally used as the plasticiser since it yields a product of the maximum toughness combined with the maximum rigidity. Other plasticisers, such as tricresyl phosphate, triacetin, dibutyl phthalate, and others, have been and are employed at times, but camphor remains the standard.

After nitration and thorough washing and stabilisation by boiling water, the pyroxylin is partly freed from water by pumping denatured ethyl alcohol through a pressed mass or "cake." These cakes are charged into a Werner and Pfleiderer kneading mixer where the pyroxylin is broken up, and the camphor, pigments, and additional alcohol are added if necessary. The mixing is continued until the pyroxylin is completely dispersed in the camphor-alcohol mixture to form a rather soft, doughlike colloid† which is then filtered by hydraulic pressure through muslin and a wire cloth supported on a perforated metal plate. If desired, the filtered colloid can be returned to the Werner and Pfleiderer kneading mixer provided with a vacuum attachment, and the excess alcohol needed for accomplishing the filtering can be distilled off and recovered.

The colloid is then sent to mixing rolls where it is worked or masticated to remove further solvent; at the same time the solvent content is kept homogeneous since any portions with a lower solvent content than the mass surrounding them will be brittle in the finished product. On the rolls the colloid is finally shaped into rectangular slabs about 0.5 in. thick.

A stack of these slabs is then placed on a grooved steel plate and transferred to the chase of a hydraulic press. Pressure is applied and steam or hot water circulated through the bottom and top plates of the press. The combination of heat and pressure welds the mass into a solid, substantially homogeneous condition.

The pressed block is then placed on a planer, and sheets,

rods, or other shapes are sliced from it with the use of a knife or a die.

The colloid may also be taken from the rolls and placed in a hydraulic or screw stuffer and extruded into the form of rods or tubes.

The sheets, rods, and tubes at the end of these operations contain up to about 10 per cent. volatile solvent which must be removed by a seasoning treatment usually consisting of hanging in a room at slightly elevated temperature.

Colouring Materials

Pigments and soluble colours may be added during either the mixing or the rolling operation. The question of where these colouring ingredients are to be added will be determined largely by practical considerations. If a large quantity of pigment is to be used, it is better to add it at the mixing stage before the pyroxylin is colloided. This prevents the dusting of the powder and facilitates its complete and rapid dispersion. If only small quantities of colouring ingredients are to be used, it is often more convenient to add them during the rolling operation. The working of the plastic in the mixer and on the rolls provides internal friction which is very effective for accomplishing dispersion of pigment aggregates. If, however, the pigment aggregates are gritty or horny in texture, it is necessary to provide an additional process to secure dispersion. This may consist of a preliminary grinding of the pigments in oil, plasticiser, or solvent in a suitable mill, such as a ball mill or a three-roll ink mill, or it may consist merely of rolling the pigment into a small portion of very stiff pyroxylin colloid to provide the necessary friction to accomplish dispersion. The mixture of colloid and dispersed colour is then usually softened with solvent before incorporation into the larger mass. The obtaining of proper dispersion is of prime importance, since the presence of any undispersed pigment results in failure to obtain its full colouring value; as a consequence the finished article will not be of standard hue or depth. Undispersed pigment also results in a speckled or gritty appearance.

Soluble colours are ordinarily added in solution. Methanol is usually the most suitable since it dissolves the greatest range of colours of any solvent. Toluene, however, is a solvent for the oil-soluble type of colour and plasticiser (4), and is sometimes employed as the colour solvent. The dye solution is usually added to the colloid at the rolling stage although practical considerations may dictate the suitability of adding it at the mixing stage. The use of the solution method of adding dyes provides a perfect method of accomplishing their dispersion. Dyes which are soluble in the plastic medium retain their full transparency and can be used for obtaining the most highly transparent effects. Dyes which are not soluble in the plastic medium but are soluble to an extent in methanol, such as certain of the acid and direct dyes, can be employed also to obtain a lesser degree of transparency provided the concentration is not too great. Dispersion of dyes in dry form into a plastic medium which is not a solvent for the dye generally results in impairment of the transparency since the dispersion is not sufficient and the particle size is too large.

Colour Development and Matching

The development of new colour effects in plastics presents a complex problem. Assuming that the base material is truly transparent, then transparent as well as translucent and opaque products may be made, according to whether pigment is used and how much. Assuming a base material which

* Reprinted from *Industrial and Engineering Chemistry*, July, 1937

† The term "colloid" is used here to designate a jelly-like mass.

is free from characteristic colour, then any hue, in any shade or tint, can be obtained through the use of proper quantities of suitable colouring materials. If a coloured transparent material is desired, either a dye or one of the transparent pigments is selected. Translucent and opaque coloured effects are obtained either by coloured pigments, by white pigments with dyestuff, or by mixtures of all three. Theoretically any colour effect may be possible, but in practice certain limitations must be recognised.

In the first place, the natural colour of the plastic medium—e.g., the slightly yellowish cast of an uncoloured pyroxylin plastic—has a marked effect on the colour of the finished product and must be taken into account in developing a new colour. In producing plastics resembling glass, it is customary to add a small amount of blue-violet to neutralise this yellowish colour. A slightly grayish cast results but is not objectionable if the thickness of the material produced is not too great. If the plastic medium is definitely dark at the beginning, it is impossible to obtain products of brilliant colour from it.

In this connection it is interesting that some of the recently developed resins, particularly polymethyl methacrylate, possess the highest clarity and are completely free from colour, so that even extremely thick layers are water-clear. Such resins obviously lend themselves to the widest range of colourations.

In the second place, no colouring material should be used which is not both adequately fast to light and unaffected by the chemical nature of the plastic itself, the solvents and plasticisers used, and the temperatures to which the plastic is subjected in manufacturing operations.

Colour Permanence

The permanence of colour in a coloured plastic depends to a large extent upon the stability of the plastic itself. This is especially true in very light transparent and translucent tints. The presence of metallic contamination is in many cases the source of serious colour difficulties, such as discolouration by sunlight which is accelerated catalytically by the impurity. Manufacturers have gone to great expense to eliminate such impurities in order to improve the stability of the product; in so doing they have at the same time definitely improved the transparency, through elimination of the serious clouding of the plastic which in many cases is also due to metallic impurities. In some plastics the greatest stability is observed at a certain optimum degree of acidity or alkalinity. Pyroxylin plastics are most stable when they are slightly on the acid side. If an attempt is made to neutralise this acidity, as through the addition of alkaline substances, discolouration results. The same is true, although to a lesser degree, of moderate acidification beyond the optimum, which is likely to result in a further increase in contamination of the plastic by contact with metals.

The high temperatures (about 150° F.) to which the pyroxylin plastics are subjected during the mixing, rolling, and pressing operations, and the prolonged exposure to moderately high temperatures in the course of seasoning, are destructive to certain dyes, particularly many of the triphenylmethane and azo groups, although by no means to all of these.

Advantage may be taken of the fact that the very nature of the plastic is in some cases the means of stabilising a colouring material. A good example is Prussian blue (ferric ferrocyanide blue) as used in nitrocellulose plastics. This pigment is stable in acid and oxidising media but unstable in alkaline and reducing media. Nitrocellulose is slightly acid and has a slight but definite oxidising action. Prussian blue has thus been found to be one of the most stable colours for use in nitrocellulose, resisting all of the influences of the manufacturing processes to which these plastics are subjected and also long periods of exposure to direct sunlight. However, if nitrocellulose sheeting tinted with Prussian blue is sandwiched between two glass plates for the manufacture of safety glass and the resulting safety glass is exposed to sun-

light, the blue tint of the plastic fades. If the glass is broken, admitting moisture and air to the plastic, the blue colour returns. This seems to indicate that sunlight has a reducing effect in the absence of oxygen.

In many other plastics Prussian blue is not permanent. In cellulose acetate it fades badly, perhaps as a result of the fact that cellulose acetate as ordinarily prepared is seldom on the acid side of neutrality. Cellulose acetate is also possibly somewhat reducing in character.

With many other colouring materials the reverse is true; that is, they are fugitive in nitrocellulose plastics but permanent in cellulose acetate plastics.

In the manufacture of variegated effects, stripes, mottles, etc., or when two sheets of dissimilar colour are to be welded together by the application of heat and pressure, the further requirement arises that the dyestuff used shall not diffuse or bleed from one coloured area into another. In general, the degree of solubility of a dyestuff in the plastic is a measure of its tendency to bleed. Insoluble colouring materials, of course, do not bleed at all.

Selection of Colouring Materials

It is essential that the plant chemist or colour matcher should have at hand an assortment of colouring materials from which he can safely make a selection when called upon to duplicate any desired shade. Every colour on this list should be absolutely permanent, but this is not entirely possible, especially with colouring materials of great brilliancy. Any limitation in the permanence of the colours used must be thoroughly understood so that the resulting coloured product will not fail to have a degree of permanence satisfactory for the use for which it is intended.

Soluble dyestuffs are largely used, particularly in obtaining transparent effects and in the formulation of the brightest colours, but frequently they lack permanence. This is most likely to be true of those that give the most brilliant colours. To meet a demand for brilliant colour effects, the colourist must comb the field in order to obtain dyestuffs that are most nearly permanent. Little has been published concerning the behaviour of colouring materials in plastic media, and the search for fast colours must therefore frequently be a matter of cut and try. Within a single group or family of dyestuffs one member may be fast and another fugitive under the conditions of use, and the reason why one or more individuals in a group presents an unusual degree of permanence is not thoroughly understood.

The colour chemist must combine his knowledge of the chemistry of the substance with an actual test of its use in his plastic, subjecting it to processes as nearly as possible the same as those to which the commercial batch will be subjected. Testing for fastness to sunlight is best accomplished by actual exposure to sunshine, preferably in the extreme southern part of the country where the actinic strength of the sun's rays does not vary so widely between winter and summer. The various artificial testing lamps are of assistance in many cases, but are not thoroughly reliable in testing colouring materials in plastics.

Of all the available dyestuffs, the familiar triphenylmethane basic colours are the brightest. They can readily be dispersed in the plastic. They have good solubility in alcohol but the disadvantage of poor resistance to sunlight. However, some brilliant colour effects can be obtained only with the use of dyestuffs of this class. The azo colours as a group are somewhat faster to light, and they are used to a considerable extent in both nitrocellulose and cellulose acetate plastics. But it has been the general observation that many of the azo colours tend to discolour as a result of the heat to which the nitrocellulose plastics are subjected during the process of manufacture. Many, however, are sufficiently permanent to be satisfactory. The sodium salts of the sulphonic acid derivatives lack ready solubility in alcohol, and it has been found preferable to take advantage of the better solubility obtained by combining the sulphonic acid derivative of the dye with certain organic bases. Oil-soluble

dyestuffs in this group are sometimes designated as colour bases; they are soluble in toluene and esters as well as in alcohol. They are of value in colouring varnishes and lacquers and in plastics of certain types, but the use of oil-soluble colours is to be avoided if bleeding is objectionable. Many of the anthraquinone and alizarin groups, as well as some of the vat dyes, are of great value in obtaining plastics of fast colour.

Transparent insoluble pigments are those which, when dispersed into the plastic by mixing or rolling, produce a transparent or nearly transparent coloured effect. This class includes Prussian blue, certain of the vat dyes such as indanthrene blue and violets, and a number of lakes precipitated in alumina hydrate such as alizarin lakes and some of the lakes of azo dyes. Many of these colours, unless used in too great concentration, do not noticeably impair the clearness of the plastic; their use in too high a concentration results in some cloudiness. The fastness to sunlight of some of these is superior to that of the soluble colours.

The list of opaque pigments contains many excellent examples, from which a selection must be made to fit the particular case in hand. Zinc oxide, for example, is excellent in plastics of many types and is a standard white pigment for use in the colouring of pyroxylin plastics, in which it has a stabilising effect without any tendency to promote hydrolysis. But it cannot be used in cellulose acetate because it promotes hydrolysis, with the formation of zinc acetate, a corresponding loss of opacity, and a deterioration of the plastic. Titanium dioxide has come into general use in plastics and has the advantages of greater hiding power and an inertness that permits its use in media susceptible to hydrolysis.

Cadmium and chromium colours furnish abundant examples of oranges, yellows, and reds, and are very permanent. Ultramarine, a translucent pigment, furnishes a satisfactory blue. Cobalt blue is very permanent, but expensive and rather dull. The blue lakes, if prepared from the triphenylmethane blues, are fugitive except when used in high concentrations. Some of the alizarin blue lakes are moderately fast. Blacks offer no particular difficulty; lampblack, ivory black, and carbon black all serve particular purposes. But it should be noted that absolute jet black cannot be obtained in plastics except through the use of the soluble nigrosines, which have the disadvantage of a tendency to bleed yellow in certain media. The earth colours, including siennas, umbers, and ochres, are completely permanent and are widely used in the colouring of plastics, although their dispersion presents some difficulty.

Designs and Mottled Effects

Frequently an important part of the colour development is the combining of two or more differently coloured portions of plastic to obtain designs or mottles. Much ingenuity is frequently necessary to work out these combinations, and a high degree of skill is required in their actual manufacture. We see the results in many of the familiar articles of commerce—for example, variegated fountain pen designs, plastic toilet sets, buttons and buckles, costume jewellery, radio parts, toys, novelties, umbrella handles and tips, scuffless heel covers, slide type fasteners, toothbrush handles, bathroom fittings, optical frames, and dentures.

In the early development of plastics many natural substances were imitated, including tortoise shell, ivory grain, onyx, horn, mother-of-pearl, jade, and various wood grains. In many of these cases the combining of one or more differently coloured plastics constituted an essential part of the process.

Tortoise shell imitation is made by combining amber and brown. The two coloured plastics, while in a soft condition, retaining a considerable portion of the volatile solvent, are passed together repeatedly through mixing rolls whereby they blend and flow together to give the characteristic shell markings.

Grained ivory is made by stacking thin sheets of ivory coloured soft plastic (the successive sheets contain slightly

different amounts of pigment), cutting the pile of sheets so obtained into sections, and turning each section at right angles so that the upper surface shows the desired grain. The sections are clamped together and consolidated in a hydraulic press with the application of heat, resulting in a new block from which sheets of grained ivory are sliced. By slicing this grained block into thin sheets, stacking the sheets, and repressing, a block is obtained that shows the ivory grain with a pleasing cross grain or moiré grain considered to imitate natural ivory more closely. Another method of obtaining an ivory grain is to roll out slabs of the two slightly different coloured ivory plastics, place the slabs one on the other, and calender them through the rolls to about a quarter of the original thickness. The long resulting slab is cut in two, one part is laid on the other, and the calendering is repeated. This is done several times until the grain is of the proper thickness. The final slab is then cut into sections and repressed so that the grain is at the top of the new block, and from this sheets are sliced.

Mosaic effects are obtained merely by cutting soft sheets of plastics into small pieces and reconsolidating in the hydraulic press into a block from which sheets are sliced.

By combining various of these operations, numerous unusual effects are obtained. For example, two colours are first grained according to one of the methods outlined and the resulting sheets are cut into small pieces and repressed.

Plastics with a pearly sheen can be made by a patented process and are much in demand in certain lines; the production of these is an interesting and important branch of the art of colouring plastics. The material for imparting the sheen may be the so-called *essence d'orient*, the brilliant coating obtained from the scale of certain fish. The particles are colourless, nearly transparent, and extremely small, and possess a beautiful lustre. When suspended in a protective colloid, such as a pyroxylin dispersion, the brilliancy is permanent. *Essence d'orient* has been used extensively in the past for imparting the lustre to artificial pearls but in recent years has come into extensive use in the manufacture of pearl plastics. Synthetic pearl essences are also used, particularly crystallised mercurous chloride and crystallised lead carbonate. Metallic powders, especially aluminium, are also used; although they are grey compared to either the natural or synthetic pearl essences, they possess considerable lustre, and a small enough particle size can be obtained to give effects in the plastic in which the individual particles are not easily detected.

Any of these lustrous pigments incorporated into plastic in the mixing process fails to show its full effect because of the indiscriminate arrangement of the particles. To bring out their full values, these particles must be oriented. The principle of orienting lustrous particles contained in a plastic was enunciated in the Higgins patents (1). The process involves the incorporation of the pearl essence or other lustrous particles into the plastic while in a softened condition, resulting from the presence of an excess of solvent, and extruding the plastic carefully through an orifice. The resulting slab can then be cut into irregular pieces, stacked into the chase of a hydraulic press, and consolidated by the application of heat and pressure into a block from which sheets are sliced. These sheets present a very fair imitation of mother-of-pearl without, however, any iridescence.

The manufacture of rods for use in the fountain pen industry presents the difficulty of arranging the oriented plastic so that the orientation is distributed approximately evenly around the rod. This may be done by producing small cubes of the oriented pearl plastic material and repressing them in a hydraulic press into a block from which rods are cut.

(1) Higgins, U. S. Patents 1,539,084 (May 26, 1925); 1,606,030 (Nov. 9, 1926); 1,607,622-4 (Nov. 23, 1926).

(2) Peacock, W. H., and Kienle, R. H., *Modern Plastics*, 14, 63 (Oct., 1936).

(3) Sproxtton, Foster, *J. Soc. Chem. Ind.*, 52, supplement, S-12 (May 19, 1933); Boehmer, G. H., *Modern Plastics*, 12, 48-9 (Sept., 1934); Stark, C., *Nitrocellulose*, 7, 121 (1936).

(4) Wood, U. S. Patent 1,966,329 (July 10, 1934).

Memorial Service for Henry Edward Armstrong

"Independent-minded, Eagle-eyed Scrutineer of Truth"

A MEMORIAL service for Professor Henry Edward Armstrong, F.R.S., was held at the Church of St. Dunstan-in-the-East, Idol Lane, London, on July 16. The Rev. A. G. B. West officiated and was assisted by the Rev. S. T. Andrews.

For the text of his address, the rector chose "Give me wisdom that sitteth by thy throne and reject me not from among thy children" (Wisdom IX. 4), and his words were a fitting tribute to the life of one who so diligently sought the path of truth.

"When we think of Henry Edward Armstrong and his life's work," said the Rector, "this is the word which seems to me to have been his inspiration and lodestar. Not that any mere layman like myself can begin to estimate his worth to research, his force in helping to usher in the new time. They who have earned the right to judge, have marked his steps and watched the sure burgeoning of his ideas and teachings—they will tell the world what his contribution has been to our generation's wealth, comfort, insight and outlook. Though indeed it may be said at once he was not one of those upon whom

"from level stand
The low world laid its hand,
Found straightway to their mind
And valued in a trice,"

much more was he *Athanasius contra mundum*, the independent-minded, eagle-eyed scrutineer of truth, as he claimed to see it—fronting the serried ranks of opposition, entrenched tradition and unscientific thought; fronting them also not without some scorn and winged barbs of resentment.

"*Pereunt et imputantur*—they pass on their way and the verdict is written. But not against him will the verdict be when claims are weighed as to whose energy and enlightenment helped to usher in the era of laboratory work for expounding the hidden things of Nature's material. Not always, maybe, when we are all amazement at the exploits of aviators who won the poles in non-stop flight; or honour the memory of a Columbus, a Cook, a Cortez or Vasco da Gama, explorers of the earth's surface, of the men who added continents to our use and whole seas to our purview. Not always do we remember that they too are explorers, investigators, blazing an untrodden path, who in the patient toil of their laboratories have ransacked the atom and touched to their source the properties of naphtha.

Explorer of Mysteries

"The chemical universe is as full of mysteries awaiting illumination for our benefit as was ever a world—400 years back only—which knew nothing of America, Australia, South Africa. Into such a silent sea of mystery and untellable wealth they burst; the pioneers, the searchers who delved and analysed, peering into the unknown universe hidden in the veins of rudest clay and crudest gas. And it is they, magicians of the occult, who in a century have added more to knowledge and power than 4,000 previous years had done. To this band of heroes *juvenum manus emicat ardens*, and even among them an outstanding star was he whose temporal setting we mark to-day.

"Intrepid, lonely, surefooted as he climbed, avid for truth, truth that could be demonstrated, harnessed, made into a flowing Pactolus river for the healing of the nations; that is something of my vision of this explorer, this Prometheus-like giver of fire to the sons of men. Be sure his works do follow him. Voltaire said of Newton that not more than once in ten centuries does the world produce such an outstanding personality—of force sublime enough to outweigh conquerors and kings and despots, those who bask in the common sunlight of popular applause. Slow indeed has the world been to realise who they are who have been its truest benefactors.

"One moment and the angels alter that" to put into their

niche these toiling selfless battlers, saving mankind in the world's despite, of whom Henry Armstrong was very far from being the meanest or least fruitful. Surely, if what I say is true, this life is a great lesson in values: I am among you as he that serveth—the Royal Society of Heroes. This is inspiration for ceaseless honest toil, certain of reward, for deeper, ever deeper sinking of the bucket into the fathomless well of that wisdom which knows the Laws of Nature to be the hand of the living God."

Names of Those Present

The principal mourners present at the memorial service were Dr. and Mrs. E. F. Armstrong (son and daughter-in-law); Mr. and Mrs. H. C. Armstrong (son and daughter-in-law); Dr. R. R. Armstrong and Mr. H. L. Armstrong (sons); Dr. and Mrs. Stephen Miall (son-in-law and daughter); Miss Nora Armstrong (daughter); Mr. Richard Armstrong, Mr. James Armstrong, Mr. Gerald Miall and Mr. Mackenzie Miall (grandsons); Mr. Stanley Lavers.

There were also present Mr. George A. T. Allen (representing Sir James Leigh-Wood, vice-chairman, and Almoners of Christ's Hospital); Mr. G. L. Addenbrooke, Colonel J. Attenborough, Mr. E. A. Andrews, Professor A. J. Allmand (representing the Royal Society); Mr. C. W. S. Averill (representing the Headmaster, Christ's Hospital); Sir William Bragg (president of the Royal Society); Mr. Julian Baker (representing the Institute of Brewing); Mr. J. J. Brown (treasurer, Christ's Hospital); Major F. C. Bentley, Professor W. A. Bone, Miss K. Bone, Mr. G. A. Bromage, Mr. Reginald Brown, Mr. R. W. Bankes (secretary, Institute of Chartered Accountants); Dr. W. F. Bewley (director, Experimental and Research Station, Cheshunt); Mr. D. Birnbaum (representing Mr. W. R. Norton); Mr. F. G. Brewer (representing South Metropolitan Gas Co.); Mr. E. A. Bevan, Mr. C. E. Brown, Dr. E. S. Beaven, Mr. William A. S. Calder (representing Viscount Leverhulme); Sir Alfred Chatterton, Dr. R. T. Colgate, Professor A. C. Chibnall.

Mr. C. G. Conolly, Mr. A. Clapham, Mr. Cecil E. W. Charrington (president, Institute of Brewing); Mr. F. W. Clifford (Chemical Society's Library); Mr. Francis H. Carr, Mr. S. E. Carr (representing Mr. Emile Mond), Mr. Harry Collison, Dr. H. E. Cox, Mr. S. E. Carr (assistant secretary, Chemical Society); Mr. Edward M. Crowther, Colonel Ian Campbell.

Sir William Davison, Dr. C. H. Desch (National Physical Laboratory), Dr. Bernard Dyer, Mr. W. F. Dyer, Miss Dyer, Miss Margaret Dyer, Mr. C. F. Denny, Mr. R. M. N. Dawlings, Mr. Walter T. Dunn, Professor F. G. Donnan (president, Chemical Society, also representing British National Committee for Chemistry, Royal Society), Mr. W. A. Davis, Mr. Alexander Dickson, Mr. Noel Deerr, Dr. J. Vargas Eyre (president, British Association of Chemists and representing the Distillers' Co.), Dr. H. J. T. Ellingham (hon. secretary, the Chemical Society and Royal College of Science Association), Mr. E. V. Evans.

Sir Martin Forster, Mr. C. H. Field, Sir Richard Gregory, Mr. F. A. Greene (treasurer, Institute of Chemical Engineers), Mr. A. G. Green, Professor R. C. Gale, Mr. G. S. Goodwin, Mr. Thomas Guthrie (vice-president, Pharmaceutical Society of Great Britain), Mr. Percy Gates, Mr. G. W. Germain (Junior Institution of Engineers), Professor C. S. Gibson, Sir Philip Hartog, Professor J. T. Hewitt, Mr. L. A. Hermes, Mr. A. C. Hartley, Mr. E. Hinks (Society of Public Analysts), Mr. H. Harding, Mr. Daniel Hall, Instructor Capt. A. E. Hall (Royal College of Science Association), Dr. E. B. Hughes (J. Lyons and Co., Ltd.), Mr. Walter C. Hancock, Dr. Hach, Mr. C. H. Isdell-Carpenter, Dr. and Mrs. L. A. Jordan, Sir Frederick Keeble, Mr. James Kewley (Asiatic Petroleum Co.,

Ltd. and Anglo-Saxon Petroleum Co., Ltd.), Dr. B. A. Keen, Mr. W. E. Knight and Mr. Carl Klein.

Mr. K. W. Luckhurst (representing Royal Society of Arts), Mrs. Lathbury, Dr. L. H. Lampitt, Dr. R. Lessing (representing London Section, Society of Chemical Industry), Dr. Roche Lynch (president, Society of Public Analysts), Mr. Hugo Lorenz, Mr. Guy E. Lloyd, Mr. C. le Maistre, Dr. R. P. Linstead, Mr. T. E. Limmer, Mrs. T. Martin Lowry, Sir Gilbert Morgan, Miss Margaret Miall, Mr. and Mrs. L. M. Miall, Mr. Thomas Martin, Dr. Ainsworth Mitchell (Society of Public Analysts), Mr. A. Marshall, Mr. A. H. Masters, Mr. C. T. Millis, Dr. Gerald T. Moody, Mr. F. J. Nettlefold (master, Leathersellers' Company), Mr. Barry Neame, Dr. D. M. Newitt, Sir David Prain, Sir Robert Pickard (vice-chancellor, University of London; president, Institute of Chemistry; chairman, Chemical Council), Dr. R. H. Plimmer, Mr. Richard B. Pilcher (registrar and secretary, Institute of Chemistry).

Major Charles E. S. Phillips (secretary, Royal Institution), Mr. Walter Prideaux, Sir John Russell, Mr. E. M. Rich (Education Officer, L.C.C.), Dr. E. H. Rodd (Imperial Chemical Industries), Miss Florence Rich, Professor R. Robinson

(Dyson Perrins Laboratory), Mrs. Robinson, Mr. H. M. Ross, Mr. R. E. Reeves, Mr. W. C. Slater, Mr. G. F. Sutton (Leathersellers' Company), Mr. F. W. Salisbury-Jones, Mr. A. W. Scott, Mr. H. C. Sayer, Mr. R. Seligman, Mr. André L. Simons (president, Wine and Food Society), Mr. C. R. Sams (hon. secretary, Old Centralians), Mr. G. Stephenson (secretary, City and Guilds, London Institute), Dr. Alexander Scott (director of scientific research, British Museum), Mr. C. E. Sage, Sir Stephen Tallents, Professor T. Turner (Birmingham University), Professor J. T. Thorpe (Imperial College of Science) and Mrs. Thorpe, Mr. H. C. A. Thieme, Dr. Donald T. A. Townsend, Dr. Henry Usherwood (headmaster, St. Dunstan's College) and Mrs. Usherwood, Dr. Voelcker (Lawes' Agricultural Trust), Professor W. P. Wynne (representing Professor Sir William Pope, Cambridge University Chemical Laboratory and Cambridge Philosophical Society), Mr. A. B. Wallis, Dr. M. A. Whiteley, Mr. E. G. Walker (president, Old Centralians), and Mr. Eben Wallace (chairman, Association British Chemical Manufacturers).

The funeral service was held privately at Golders Green Crematorium, the Rev. A. G. B. West officiating.

Economic and Commercial Conditions in Poland

Progress in Polish Chemical Industry

A REPORT by the Commercial Counsellor to H.M. Embassy at Warsaw, on economic conditions in Poland, reviews conditions up to the end of March, 1937, two years after the Anglo-Polish Trade Agreement came into force. This report is published for the Department of Overseas Trade by H.M. Stationery Office (price 1s.).

Exports from the United Kingdom to Poland have increased by 15 per cent. during the period under review. The exchange control restrictions which it became necessary to impose in Poland a year ago and the extension of the quota system to almost all commodities have not had any adverse effect on United Kingdom trade. A large proportion of the imports into Poland have been capital goods required in connection with the development of industry and some less essential imports have been reduced. Nevertheless the favourable trade balance has been largely reduced, and the Polish Government encountered some difficulty in meeting the service of certain foreign loan issues. The situation was eased at the end of last year, by the successful conclusion of negotiations for a French loan. The budget for the financial year 1936-37 was balanced for the first time for a number of years. The internal financial situation now shows definite improvement, though expenditure on all but the most essential requirements has to be kept to a minimum.

Sulphuric Acid Production

Poland's natural resources include many of the important raw materials on which the chemical industry is based; coal, salt, sulphide ores, potash salts, phosphates, oil and other minerals as well as supplies of animal and vegetable raw materials. Sulphuric acid and hydrochloric acid can thus be produced from indigenous raw materials, while nitrates and ammonia are produced from the air by processes of Polish invention. The production of sulphuric acid in 1935 and 1936 was 123,525 and 128,331 tons respectively.

The principal products of the heavy chemical industry are soda, potash, cyanamide, nitrates and ammonia. There is an important production of soap, paint and varnish, turpentine and a growing production of cosmetics, pharmaceutical goods, coal tar derivatives and fine chemicals of many kinds. Artificial silk fibre is an increasingly important item, and the production of casein fibre ("Lanital" artificial wool) is planned to commence shortly. Raw materials lacking in Poland are ores of barium, tin, copper, nickel, chromium and

manganese, which must be imported. There is also a shortage at present of animal fats and waste products.

The development of the Polish chemical industry is retarded by a lack of capital. It is estimated that the capital invested in this branch amounts to about 1,000 million zloté, of which 50 per cent. represents foreign investments, 30 per cent. Polish private capital and 20 per cent. Government capital.

Many New Products

New items produced in Poland during 1936 included: Tobias' acid, lanoline, graded kaolin, vanillin, chemically pure petrol spirit "pro analysi," methyl chloride, magnesium carbonate, dinitrobenzine b.p. 84°C., blanc fixe, salts of antimony, barium, bismuth, zinc, tin, cadmium, cobalt, lithium, nickel, selenium and strontium (raw materials are imported); new organic intermediates, such as benzolsulphamide, dichlorobenzidine, naphthylaminosulphonic acid "Cleve," and *para*-amidosalicylic acid; glue for plywood; regenerated rubber; various new cosmetics, including emulsion bases formerly imported; wood felting, yarn bleaching, and textile full preparations, etc. The increased variety of chemicals produced is calculated to reduce imports from abroad and the developments in the last two or three years have already made an appreciable difference in this respect.

The Oil Industry

This industry is centred round three districts: Jaslo, Drohobycz with Boryslaw, and Stanislawow. In recent years the output of crude oil has been decreasing, although as a consequence of more intensive drilling operations the decrease was somewhat less in 1936. Of the refined products approximately 67 per cent. were consumed in Poland and 33 per cent. exported.

Synthesis of Fluoroform

The novelty of the synthesis of fluoroform presented in a paper by Henne (*J. Am. C.S.*, 1937, 59, 1,200-2) resides in the combined use of antimony fluoride and mercuric fluoride as fluorinating agents, whereby two atoms of fluorine are introduced into the molecule by the antimony fluoride, the third fluorine atom being introduced subsequently by the mercuric fluoride. Fluoroform is characterised by exceptional physiological and chemical inertness. The work of synthesis can be extended to other compounds.

Chemical and Allied Trades of the United Kingdom

General Increase in Production

FURTHER particulars from the fifth Census of Production (1935), so far as the chemical and allied trades are concerned, are published in the *Board of Trade Journal* for July 15.

In the soap, candle and perfumery trade the value of products (gross output) was £26,255,000, as compared with £25,368,000 for 1934. The total make of crude glycerine, including output used for further manufacturing purposes at the same works, was 482,000 cwt., whereas in 1934 it was only 442,000 cwt. Of this quantity, 370,000 cwt. of crude glycerine valued at £569,000, and 125,000 cwt. of distilled glycerine valued at £288,000, were made for sale. Other principal products made for sale included:—

	1935.		1934.	
	Quan- tity.	Value.	Quan- tity.	Value.
	Th. Cwt.	£ '000	Th. Cwt.	£ '000
Soap for household and domestic purposes, including government and municipal contracts	8,919	15,150	8,930	15,545
Soap for industrial purposes, including laundries ...	1,016	1,136	903	997
Soap made for sale to other soap or perfumery manufacturers for further processing ...	331	356	372	366
Perfumery, cosmetics and toilet preparations ...	—	6,571	—	5,387

A comparison of production, exports and imports of soap, perfumery, etc., is given below:—

	Production.		Exports.		Retained imports.	
	Th. Cwt.	£'000	Th. Cwt.	£'000	Th. Cwt.	£'000
Soap ...	1935	9,935†	816	121	121	121
	1934	9,833†	990	156	156	156
Perfumery, cosmetics and toilet preparations	1935	6,571	1,015	135	135	135
	1934	5,387	930	134	134	134

In the paint, colour and varnish trade the value of products (gross output) was £21,737,000 in 1935 and £19,747,000 in 1934.

The value of the gross output of the firms whose returns were made on schedules for the seed crushing trade was £22,306,000 in 1935 and £17,189,000 in 1934. Principal products included:—

	1935.		1934.	
	Quan- tity.	Value.	Quan- tity.	Value.
	Th. Tons.	£'000	Th. Tons.	£'000
Unrefined oils ...	284.7	6,104	235.9	4,022
Refined oils ...	272.0	7,144	254.3	5,301

Production and exports and imports of these principal products were:—

	Production.		Exports.		Retained imports.	
	Th. tons.	£'000	Th. tons.	£'000	Th. tons.	£'000
Unrefined oils ...	1935	440.6	60.8*	197.1*	197.1*	197.1*
	1934	391.8	30.7*	173.9*	173.9*	173.9*
Refined oils ...	1935	272.0†	52.5	21.3	21.3	21.3
	1934	254.3†	32.4	19.4	19.4	19.4

In the oil and tallow trade the gross value of the products was £17,153,000 in 1935 and £13,769,000 in 1934.

	1935.		1934.	
	Quantity.	Value.	Quantity.	Value.
	Th. tons.	£'000	Th. tons.	£'000
Animal oils, fats and greases ...	90.2	1,934	75.5	1,409
Fish and marine animal oils ...	112.1	1,913	88.2	1,586

The total output of crude shale oil (including oil refined or otherwise used in the producers' works) and refined petroleum (including petroleum refined on commission, and output used at the refineries) was as follows:—

(i) Crude shale oil:

	1935	1930
Th. galls.	30,540	38,181

(ii) Refined petroleum.

	Produced from crude oil.	Produced from semi-refined oil.	Total.
1935	302,749	151,888	475,437
1930	419,652	189,946	609,598

The value of the principal products was £8,602,000 in 1935, and £14,338,000 in 1930.

GENERAL SUMMARY OF CHEMICAL AND ALLIED TRADES

Trade	Gross Output (selling value of goods made and value of work done). (2)	Cost of materials, fuel and electricity used and amount paid for work given out. (3)	Net output (excess of col. (2) over col. (3)). (4)	Average numbers of persons employed. (5)	Net output per person employed. (6)
(1)	(2)	(3)	(4)	(5)	(6)
Chemicals, Dye-stuffs and Drugs	1935 67,324 1934 62,707 1930* 52,653	1935 30,609 1934 28,981 1930* 26,528	1935 35,975† 1934 32,996† 1930* 24,985†	1935 75,549 1934 73,347 1930* 70,475	1935 476 1934 450 1930* 355
Fertiliser, Disinfectant, Glue and Allied Trades	1935 7,416 1934 5,684 1930* 5,717	1935 4,455 1934 3,002 1930* 3,116	1935 2,961 1934 2,682 1930* 2,601	1935 9,592 1934 9,112 1930* 8,548	1935 309 1934 294 1930* 304
Soap, Candle and Perfumery ...	1935 26,255 1934 25,368 1930* 29,105	1935 13,074 1934 12,162 1930* 16,200	1935 13,181 1934 13,206 1930* 12,905	1935 29,071 1934 28,139 1930* 27,010	1935 453 1934 469 1930* 478
Paint, Colour and Varnish	1935 21,737 1934 19,747 1930* 19,528	1935 11,170 1934 10,261 1930* 10,895	1935 10,567 1934 9,486 1930* 8,633	1935 24,668 1934 23,289 1930* 21,292	1935 428 1934 407 1930* 405
Seed Crushing ...	1935 22,306 1934 17,189 1930 21,824	1935 17,950 1934 13,320 1930 19,407	1935 4,356 1934 3,869 1930 2,417	1935 11,367 1934 10,754 1930 10,992	1935 383 1934 360 1930 220
Oil and Tallow...	1935 17,153 1934 13,769 1930* 16,446	1935 11,704 1934 9,239 1930* 11,496	1935 5,449 1934 4,480 1930* 4,950	1935 9,568 1934 8,241 1930* 8,081	1935 570 1934 544 1930* 613
Explosives and Fireworks	1935 5,516 1934 4,920 1930 4,998	1935 2,203 1934 2,011 1930 2,151	1935 3,313 1934 2,909 1930 2,847	1935 9,870 1934 8,990 1930 8,697	1935 336 1934 324 1930 327
Starch and Polishes ...	1935 7,032 1934 6,464 1930 6,997	1935 2,792 1934 2,531 1930 2,997	1935 4,240 1934 3,833 1930 4,000	1935 8,573 1934 7,846 1930 7,962	1935 495 1934 495 1930 502
Ink, Gum and Typewriter Requisites ...	1935 4,272 1934 3,608 1930 3,468	1935 1,741 1934 1,469 1930 1,464	1935 2,531 1934 2,139 1930 2,004	1935 4,919 1934 4,416 1930 4,029	1935 515 1934 484 1930 497
Total (trades covered by the Import Duties Act Inquiry, 1934)	1935 179,011 1934 159,456 1930 160,736	1935 95,698 1934 83,076 1930 94,254	1935 82,573 1934 75,650 1930 65,342	1935 183,177 1934 174,134 1930 167,086	1935 451 1934 434 1930 391
Petroleum ...	1935 8,441 1930 16,087	1935 5,179 1930 10,371	1935 3,262 1930 5,716	1935 4,158 1930 5,626	1935 785 1930 1,016
Match ...	1935 4,340 1930* 4,264	1935 717 1930* 761	1935 1,517† 1930* 1,483†	1935 3,745 1930* 4,017	1935 405 1930* 369
Unclassified Trades (Northern Ireland) ...	1930 436	212	224	633	354
Total ...	1935 191,792 1930 181,523	1935 101,594 1930 105,598	1935 87,352 1930 72,765	1935 191,080 1930 177,362	1935 457 1930 410

* Great Britain.

† Exclusive of Excise duty estimated as follows:—

	1935	1934	1930
	£'000	£'000	£'000
Chemicals, Dyestuffs and Drugs ...	740	730	1,140
Match ...	2,106	—	2,020

Chemical Matters in Parliament

Production of Oil from Coal

IN the House of Commons on July 20, Mr. E. Dunn asked the President of the Board of Trade how many firms of foreign origin have been granted patent rights in this country to extract oil from coal; how many firms have exercised their patent rights by the establishment of works; to what countries patent rights have been granted in the years 1935, 1936 and 1937; and whether any objections had been raised by British firms in the like business and in the same years?

In reply to the first part of the question, Mr. Stanley said, United Kingdom patents relating to the extraction of oil from coal had been granted in the last 24 years to 62 different persons and companies residing or carrying on business in foreign countries; as regards the third part of the question in 1935, 1936 and 1937, 90 patents for such inventions were granted in this country to persons in Liechtenstein, 34 to Germany, 12 to France, 7 to Switzerland, 4 to the United States of America, 3 to Australia, and 2 to the United Kingdom. Information on the second and fourth parts of the question is not available.

Mr. A. Jenkins then asked the Secretary for Mines whether he is now in a position to state whether the hydrogenation plant at Billingham is a commercial success or otherwise; and, if he is not in possession of the information, will he approach Imperial Chemical Industries, Ltd., with a view to obtaining the information?

Mr. Ellis Smith also asked the Secretary for Mines whether he can make a statement on the Government proposals for extracting oil from coal; and when the Falmouth Committee intends to report?

Sir Philip Dawson, in addition, asked the Secretary for Mines whether the plants proposed to be installed in the distressed areas are to be merely low-temperature carbonisation processes which cannot materially increase the demand for coal, or whether other processes such as are now operating in Germany, and which directly or indirectly convert the whole of coal substance into liquid fuel, will be put down, or whether a combination of low-temperature carbonisation and of some other processes will be installed?

In reply to these questions, the Secretary for Mines (Captain Crookshank) said that he could not make any statement on this subject until the Falmouth Committee had reported, and he could not yet say when that will be.

Production Statistics

Mr. Jenkins asked the Secretary for Mines the quantity of coal consumed in Great Britain in 1934, 1935 and 1936, and the estimated consumption for the present year in hydrogenation, in high-temperature carbonisation, and in low-tem-

perature carbonisation, respectively; and the respective quantities of petrol or benzol, and of heavy oils produced?

In reply to Mr. Jenkin's question Captain Crookshank gave the information tabulated below:—

		1934.	Coal Consumed in 1935. 1936.		1937 (estimated).
			Thousand Tons.	Thousand Tons.	
Hydrogenation	...	Nil	267(a)	425(a)	450
		Plant under construction.			
High Temperature Carbonisation	...	34,787	35,477	39,116	40,000
Low Temperature Carbonisation	...	284	327(b)	384(b)	530
Petrol and Motor Benzole and Heavy Oils produced.					
Petrol and Motor Benzole. Heavy Oils.(c)					
		1934.	1935.	1936.	1937 (estimated).
				(estimated).	
Hydrogenation	Nil	20.8	33.3	37.5	—
		Plant under construction.			
High Temperature Carbonisation	...	39.2	44.5	51.2	53.5
Low Temperature Carbonisation	...	0.5	0.7	0.8	1.0
					2.1
					3.4
					3.7
					6.0

NOTES.—(a) These figures include coal directly hydrogenated and also that for steam raising, power generation, hydrogen production ancillary both to direct coal hydrogenation, and also to tar oil hydrogenation. In addition to coal, quantities of creosote and low temperature tar oils were hydrogenated to obtain the quantities of petrol shown.

(b) In addition to coal, small quantities of tar and oils were processed to obtain the products shown.

(c) Only a small proportion of these oils are used as fuel oil. See also note (a) as to their use in connection with hydrogenation.

Committee Appointed

In a written question, Sir P. Dawson asked the Minister for the Co-ordination of Defence what are the terms of reference of the committee he has appointed to examine the question of producing oil from coal; whether this committee will have the authority to retain experts to advise them and to examine and report what has been done in connection with this matter on the Continent, more particularly in Germany; and whether the committee will call evidence from any engineer or chemist who has held responsible positions in connection with any oil from coal plant operated abroad?

In reply, Sir T. Inskip said the terms of reference of the committee are: "To consider and examine the various processes for the production of oil from coal and certain other materials indigenous to this country, and to report on their economic possibilities, and on the advantages to be obtained by way of security of oil supplies in emergency." As regards the second part of the question, the committee has not been restricted in any way as to the manner in which it should carry out its work and he was quite satisfied to leave the points mentioned to the committee.

Emergency Fuel Supplies

Hydrogenation of Coal

MR. W. R. GORDON, director of the Coal Utilisation Council, in an address to the Cardiff Rotary Club on July 19, emphasised the importance of safeguarding supplies of liquid fuel as an essential element in British defence measures. He advocated more production of liquid fuel from coal, aided on a large scale by the State if necessary. He said that there should also be direct encouragement of coal and its derivatives for road transport through the use of trolley buses, steam wagons, vehicles driven by compressed and producer-gas, and electric battery vehicles. It was said that the 15,000,000 tons of coal which would be necessary to produce all our requirements of petrol by hydrogenation represented only about 6 per cent. of our output, and therefore would not save the coal industry. That 15,000,000 tons would be a substantial help and would result in the employment of tens of thousands more miners.

Iron and Steel Production

Record Figures for June

THE figures for iron and steel production during June show that the output of pig-iron during the month was 699,300 tons, the highest figure since 1927 and a record under modern conditions of manufacture.

The number of blastfurnaces in operation at the end of June was 126—against 122 at the end of May—six furnaces having been blown in and two having ceased production. Of these four net additional furnaces one is the large new furnace at Corby, which has a capacity in excess of 3,000 tons a week and which came into operation on the last day of the month and did not contribute to the month's output. The three other furnaces did not come into operation until the middle of the month. The steel output during June shows the very high figure of 1,106,400 tons, bringing the total for the half-year up to the record of 6,338,400 tons against 5,743,400 tons for the first half of 1936.

Co-operation Between Dye Users and Makers

Annual Report of the Colour Users' Association

IN its annual report for the year ended April 30, 1937, presented at the annual general meeting on July 23, the Council of the Colour Users' Association looks forward with confidence to a continuance of the support of dye users in the work which is being done by the Association on their behalf. The council, in particular, wishes to place on record its appreciation of the valuable technical services rendered by the Joint Technical Committee of Users and Makers which continues to facilitate the smooth working of the Dyestuffs Advisory Licensing Committee and in the placing of intermediates on the Free List.

During the year under review Mr. Arthur K. Davies has occupied the office of president, Sir Henry Sutcliffe Smith that of chairman, and Mr. W. W. L. Lishman that of hon. treasurer.

Mr. F. O. Ashmore, of the Calico Printers' Association, Ltd., was again co-opted a member of the council of the Colour Users' Association.

Dyestuffs Advisory Licensing Committee

The term of office of Mr. N. G. McCulloch and Mr. C. M. Whittaker as two of the association's representatives on the Dyestuffs Advisory Licensing Committee expired on July 17, 1936, and on being again nominated by the association they were duly appointed to the committee by the Board of Trade for a further term of office.

The work of the Dyestuffs Advisory Licensing Committee has proceeded smoothly, and along the general lines of policy evolved by the previous committees during the past 14 or 15 years. Members of the Dyestuffs Industry Development Committee and the Licensing Committee were invited to view dyeing processes at two branches of works of the Bradford Dyers' Association, Ltd., at Bradford, so that they could have a "bird's eye" view of the application of dyewares, which they might find useful in their work on the committee.

The Publicity and Statistics Committee have had under consideration the high prices of dyewares, and submitted to the chairman a memorandum which reviewed the position generally and contained the conclusions that current prices were too high as compared with pre-war, the cost of speciality products was excessive, and that the absence of competition had its effect on the situation. The association's representatives on the joint consultative committee, appointed in accordance with the recommendation of the Import Duties Advisory Committee, and the council of the association gave this question very close consideration, and were forced to the conclusion that the whole level of dyeware prices was too high.

Import Duty on Intermediates

A large number of intermediates used by dyers and printers as dyestuffs have been placed on the Free List as a result of action taken by the association, and apart from new products there are comparatively few intermediates used by dyers and printers which are not already on the Free List. The attitude of the Import Duties Advisory Committee now is that further additions to the Free List should not be by block lists, but each product should be considered on its merits, and there should be some evidence of use on an appreciable scale before further products are allowed free importation.

The council of the association desire to impress upon members that they should report to the secretary any cases in which they are interested with a view to an application being made to the Import Duties Advisory Committee. The established procedure now is that in the first instance the Joint Technical Committee of Dye Users and Dye Makers consider the product and report as to whether it is made in this country. If not, an application for its inclusion on the Free List is then prepared by the association, backed by the statement of the joint technical committee and approved by the makers' repre-

sentatives on the joint consultative committee, before submission to the Import Duties Advisory Committee.

The Safeguarding of Industries Act has been extended by Section 5 of the Finance Act, 1936, for a further period of ten years expiring on August 19, 1946. During the year under review the manufacture of oxalic acid in this country on a commercial scale has been established and in consequence the exemption from 33½ per cent. Key Industry Duty which has been enjoyed by users in respect of this product has been removed and the duty of 33½ per cent. became applicable as from December 14, 1936.

The de-valuation of the Swiss franc caused the council of the association to consider the question of the necessity of reductions in dyeware prices from the Swiss manufacturers, and a communication was sent by the chairman on behalf of the council to the Swiss manufacturers urging that colour users should be given the benefit resulting from the devaluation. The Swiss manufacturers were sympathetic and stated that they would consider applications for reductions in prices of particular dyestuffs from individual firms as and when they were received. At the same time they pointed out that they were faced with higher wages through the increased cost of living, and also with the high prices of raw materials purchased from foreign countries.

Dye Dermatitis

The Dermatitis Committee, set up as a result of a meeting convened by the chairman of the Colour Users' Association in January, 1934, has consistently followed its policy of collating information as to alleged dye dermatitis claims. The chairman of the association and Major L. B. Holliday, representing the dyestuffs makers, called a meeting of persons interested in the dermatitis question which was held in Manchester on July 17, 1936, at which the interim report on alleged dye dermatitis was presented and was followed by a very interesting discussion. A resolution was passed at that meeting suggesting that the committee should approach the trade federations with a view to forming a representative organisation, with financial backing, to carry on the work of that committee.

Subsequently a meeting was convened and held in London on October 9, 1936, at which it was resolved that a Joint Standing Committee on Alleged Dermatitis be constituted. This committee is now functioning under the chairmanship of Mr. C. M. Whittaker and an appeal has been made to the trade for funds for the administration expenses. The committee has been responsible for the preparation and distribution to the retail trade of leaflets which the committee suggest should be handed to complainants with a request that they be passed on to the doctor, and it is hoped that by means of this propaganda a deterrent atmosphere will be created.

An important matter was raised with regard to the number of colour shades in the fashion cards issued by the British Colour Council. It was suggested by a member and agreed by the council of the association that at present there were too many shades recommended which resulted in losses on dyeing caused by the multiplicity of shades which had to be dyed in small lots with a consequent increase in labour charges and wastage of dyes. In addition there was a tendency for heavy shades which had to be dyed with the more expensive types of dyes. It was felt that it might be possible for the British Colour Council to issue a shade which might be near enough for fashion purposes, but which could be produced by much less expensive dyestuffs than the shade they had selected.

At the request of many members a Year Book has been issued by the association for 1937 containing useful information on the work of the association and the various Acts of Parliament affecting dyestuffs. A few additional copies are available on application to the secretary of the association.

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Dermatitis Contracted by Colour Worker

Important Action under Workmen's Compensation Act

AN important action under the Workmen's Compensation Act, was heard in the Bow County Court, on July 16, before Judge Forbes, in which J. W. and T. A. Smith, Ltd., colour merchants, of 249 Old Ford Road, E., asked for a review of compensation, the respondent being John Hugh McCarthy, of 7 Devonshire Road, Stratford, E., a fitter's mate. Mr. H. Pugh appeared as counsel for the applicants, and Mr. Childs, barrister, for the respondent.

In opening the case, Mr. Pugh said the respondent was a fitter's mate, 45 years of age, who contracted dermatitis and was certified on June 19, 1936. He had been earning an average of £3 10s. 10d. a week. He had been examined that morning by their doctor and two doctors for the respondent, and there seemed no particular disagreement as to his present fitness for work.

Mr. Childs said there was some disagreement as to respondent's money, as he had previously been employed as a stoker with Linfoot and Cooper, Ltd., colour manufacturers, of Maryland Road, E., and was earning £5 5s. a week. After his first attack of dermatitis, his money was reduced to the present rate.

Mr. Pugh said this was the first they had heard of this, because if he had had dermatitis before, which they did not know, obviously they were the wrong parties to pay compensation at all to the respondent. He could not see how it affected the present case at the moment, because they had

actually acknowledged their liability, and had been paying the man 30s. a week as compensation.

The respondent was called to give evidence and said he was still suffering from dermatitis, and could not find any other work to do. He admitted that when with Linfoot and Cooper, Ltd., he had dermatitis, and in fact had had it on and off for five years.

Mr. Pugh, in addressing his Honour, said this raised a very complicated point. Under the Act, if the respondent had contracted dermatitis, and was recovering from it, if he was capable of doing other work in the open market, he was not entitled to recover full compensation. On the other hand, if this was a matter that it had been through long and continued exposure to dust and liquids of a deleterious nature, then he would unquestionably be entitled to compensation, but curiously enough, they, the applicants, would not be responsible. He was not disputing that the respondent under the present circumstances was entitled to some little compensation, and he put it down that the man might earn £2 10s. a week, and would be entitled to the half difference between that and £3 10s. It had to be borne in mind that the respondent might not be satisfied with that and would be desirous of getting full compensation, which complicated the matter as to liability. It was rather an extraordinary case.

Judge Forbes said it was a case of such an important nature that he would reserve judgment.

Personal Notes

LORD AMULREE has been elected chairman of the Royal Society of Arts for the coming year, in succession to Sir Henry McMahon.

PROFESSOR SYDNEY C. B. PENNINGTON, of Holly Grove, Newport, Shropshire, emeritus professor of agriculture at the University of Reading, has died at the age of 68.

LADY SMITH, wife of Sir Frank E. Smith, secretary of the Department of Scientific and Industrial Research, was recently injured in a collision between two cars at a crossroads at Maidenhead.

MR. P. M. S. BLACKETT, F.R.S., has been appointed to succeed Professor W. L. Bragg, as Langworthy Professor of Physics at Manchester University. Professor Bragg is leaving Manchester at the beginning of November, when he takes up the post of director of the National Physical Laboratory.

MR. ANDREW DENIS McNAB, joint manager of John McNab and Co., Ltd., bleachers, of Howwood, was married to Miss Nancy Niven Lauder, younger daughter of Mr. and Mrs. Francis A. Lauder, of Bowden Hall, Chapel-en-le-Frith, at Chapel-en-le-Frith Parish Church on July 10.

MR. A. G. GAYDON, Ph.D., A.R.C.S., Royal College of Science, 1929-34, research physicist, British Cotton Industry Association, 1934-36, has been awarded a special Beit Research Scholarship for research in spectroscopy under the direction of Professor G. P. Thomson, F.R.S.

MAJOR PAUL MURPHY, who was formerly director of experiments at the Chemical Warfare Station, Porton, has died at Pickering, Yorks. Six years ago he wrote a book, "Armadas of the Sky," in which he insisted that the airman and the chemist were going to dominate wars of the future unless the League of Nations succeeded in its real task.

MR. H. A. C. MCKAY, B.A., B.Sc., Balliol College, Oxford, 1931-35, Institut fur Teoretisk Fysik, Copenhagen, 1935-37, has been awarded a Beit Fellowship, 1937-38, for a proposed investigation of chemical problems by the radio-active indicator method, under the direction of Professor J. C. Philip F.R.S., at the Imperial College of Science and Technology.

MR. B. J. FLETCHER, retired works chemist, of Pollokshields, Glasgow, has left estate valued at £14,770.

PROFESSOR M. T. BOGERT, professor of organic chemistry at Columbia University, New York, has been elected a foreign honorary fellow of the Royal Society of Edinburgh.

HONORARY G. BARGER has received the honorary degree of Doctor of Pharmacy from the University of Lausanne. He is the present holder of the chair of chemistry in relation to medicine at Edinburgh University.

MR. ARCHIBALD MACDONALD, head foreman of the chemical department of the Scottish Co-operative Wholesale Society, Shieldhall, Glasgow, has just retired after 40 years' service. Mr. Alex. Gebbie, manager of the chemical department, will retire next year.

MR. J. D. GRIFFITH DAVIES, an administrative assistant in the Education Department at Leeds, has been appointed assistant secretary of the Royal Society. He is one of the founders and also honorary secretary of the Leeds and District Oxford Association, which is one of the largest associations of old Oxford men and women in the provinces.

MR. D. A. HOWES has received the degree of D.Sc., Birmingham University, for his treatise on "The Principles of Motor Fuel Preparations," which was written in collaboration with Professor A. W. Nash, and for his papers which have been published in the *Journal of the Institution of Petroleum Technologists* and elsewhere, one of the outstanding papers being on "The Use of Synthetic Methanol as a Motor Fuel."

MR. A. D. RITCHIE, who is lecturer in physiological chemistry at Manchester University, is to become the Sir Samuel Hall Professor of Philosophy, in succession to the late Professor J. L. Stocks. He will take up his duties in September. During the war he served as a chemist in the Royal Naval Air Service. In 1920 he was elected to a fellowship at Trinity College, Cambridge, his dissertation being entitled "Scientific Method." He came to Manchester in 1920, was appointed lecturer in biological chemistry in 1922, and to his present lectureship in 1924.

From Week to Week

THE PROPERTIES OF CHROMIUM-MOLYBDENUM CREEP-RESISTING STEEL for steam pipe flange bolts are tabulated in a new leaflet (No. 403) which has been issued by Hadfields, Ltd.

A DEPUTATION FROM INVERNESS TOWN COUNCIL has come to London to lay evidence before the committee appointed by the Minister of Defence to inquire into the production of calcium carbide in Britain.

FOR FIRING B.O.C. TECHNICAL BOOKLETS, the British Oxygen Co., Ltd., are supplying a serviceable patent Napierian rod binder. Binders will be supplied free upon application to the nearest local works of the company.

A WORKMAN WAS SEVERELY INJURED in an explosion, which occurred on July 15 at the Westquarter Explosives Factory, near Falkirk, which is owned by Nobel Explosives Co., Ltd. The injured man, Charles Mochnie, is a process worker.

WORLD PRODUCTION OF TIN in the first five months of the current year totalled 75,477 tons, according to the July issue of the International Tin Research and Development Council's Bulletin, published by The Hague Statistical Office.

SELF-CLEANING TWIN STRAINERS, for use at power stations, gas works, canning and other factories where it is necessary to have continuous flow and full protection from choked pumps and pipes, are described in a leaflet (STR 12) of F. W. Brackett and Co., Ltd.

EAGLESCLIFFE CHEMICAL CO., LTD., of Urray Nook, Eaglescliffe, Co. Durham, have increased their nominal capital by the addition of £75,000, beyond the registered capital of £25,000. The additional capital is divided into 25,000 ordinary and 50,000 6 per cent. preference shares of £1 each.

CAUSYTH, LTD., manufacturing, research, dispensing and analytical chemists, of 143 St. Stephens House, Victoria Embankment, London, S.W.1, are increasing their nominal capital by the addition of £500 in £1 shares beyond the registered capital of £100.

THE BRITISH MEDICAL ASSOCIATION, at its annual conference at Belfast, last week adopted a resolution, proposed by Dr. A. T. Jones (Glamorgan), asking the council of the association to pursue its policy in regard to chemical warfare, first by keeping alive co-operation with the medical and scientific bodies in all countries, and secondly by appointing a committee to institute any measures which would diminish, if not prohibit, all chemical warfare.

THE DIRECTORS OF BENN BROTHERS, LTD. (proprietors of THE CHEMICAL AGE) have recommended the payment of the following final dividends less tax for the year ended June 30, 1937: Three per cent. on preference shares, which with the interim dividend of 3 per cent. paid in February makes 6 per cent. for the year. 10 per cent. on ordinary shares, which with the interim dividend of 5 per cent. paid in February makes 15 per cent. for the year. 2s. per share on the deferred shares, which with the interim dividend of 1s. per share paid in February makes 3s. for the year.

THE PRESERVATIVE TREATMENT OF ESTATE AND FARM TIMBER is discussed at length in a booklet which has been published by the British Wood Preserving Association (price 6d.). Since the first edition of this booklet was published in 1933, certain changes and additions have been made, the chief of which is the replacement of the creosote specification of 1921 by the new specification of 1936. Greater space is also devoted to water-soluble and oil-soluble preservatives; with regard to these it is stated that the Association will be glad to supply the names of firms from whom the raw material or proprietary brands can be obtained.

PLANT PROTECTION, LTD., a private company recently registered, is to control the horticultural interests of Imperial Chemical Industries, Ltd., Cooper, McDougall and Robertson, Ltd., and Abol, Ltd., engaging in the manufacture of plant insecticides, fungicides and allied products. Research work will be carried out at the I.C.I. Entomological and Mycological Research Station at Jealott's Hill and at the C.M.R. Field Research Station at Yalding. The directors are all representatives of either I.C.I., or Cooper, McDougall and Robertson. Mr. J. G. Nicholson is the chairman and Mr. T. A. Robertson the managing director.

THE CANADIAN GOVERNMENT'S CAMPAIGN in the South of England to promote greater trade between this country and the Dominion was inaugurated at Southampton on July 19. The campaign is one of the features of Merchant Navy Week. Speaking at a luncheon on board the Canadian Pacific liner "Empress of Britain" in Southampton Docks, Mr. Vincent Massey, High Commissioner for Canada, pointed out that reciprocal trade between Canada and the United Kingdom had played its part in the development of the mercantile marine. On the other hand, without the merchant navy this commerce would never have developed. Commerce could mean not only the exchange of goods, but commerce of things of the mind.

THE NEW EXHIBITION BUILDING AT EARLS COURT, which is said to be the largest reinforced concrete building in Europe, is nearly complete, and will be opened in September.

COMPACT CHEMICALS, LTD., 49 Queen Street, Glasgow, have been admitted to membership of the Glasgow Chamber of Commerce.

CITRUS PRODUCTS CO. have rented a factory at North Hillingdon, Glasgow, to develop an industry for the derivatives of citrus fruits.

NEARLY 90 PER CENT. OF THE AVAILABLE EXHIBITING SPACE at the Birmingham Section of the 1938 British Industries Fair has already been applied for.

THE PROMOTERS OF THE SUGAR BEET MARKETING SCHEME have decided to defer action for the time being, and as a result the scheme will not be submitted to Parliament during the present session.

GERMAN FOREIGN TRADE FIGURES for June show an excess of imports over exports to the value of about £1,600,000. Imports for June were £41,700,000, an increase of nearly 13 per cent. over May. The value of exports in June was £40,083,000, an increase of £2,000,000 over May.

THE SWEDISH PULP CO., the largest producer and exporter of wood goods and pulp in Europe, is to build a factory for dealing with by-products. The new factory will be situated at Sandarne, not far from Soderham. Among the by-products to be obtained are soft soap, resin and pitch.

VIBRATING SCREENS of several types, including laboratory models, are described and illustrated in Publication 1630 of the Sturtevant Engineering Co., Ltd. One of the laboratory screens will deal with material up to a fineness of 100 mesh, at capacities varying from 1 to 10 cwt. per hour; if desired, it may be run continuously.

AN ASSOCIATION OF LONDON GAS DETECTION OFFICERS was formed on July 14, under the chairmanship of Mr. A. J. Somers. The object of the association is to promote the efficiency of the London Gas Detection Service. The hon. secretary, Mr. G. E. Gale, 89 Beaconsfield Road, Blackheath, S.E.3, will be pleased to supply further information.

THE RECENT ISSUE OF NEW SHARES in Broom and Wade, Ltd., met with ready response. Applications were received for considerably more than twice the number of shares available. Shareholders in the company were offered 98,846 shares at 15s. per share on the basis of one new share for every five held, together with the right to apply for 6,923 shares remaining unissued and any balance of the 98,846 shares not applied for.

THE RUBBER GROWERS' ASSOCIATION have now published a second edition of their brochure dealing with the use of rubber in paints and varnishes. The association is prepared to consider applications for the operation of the patents mentioned in this brochure under terms of a free licence. Inquiries should be addressed to the Secretary, Rubber Producers' Research Association, 19 Fenchurch Street, London, E.C.3.

CONSUMPTION OF TRANSPARENT CELLULOSE WRAPPING in the United Kingdom during the first half of this year was 33 per cent. greater than in the corresponding period in 1936. Output is estimated to have increased from 51,020 cwt. in 1936 to 71,365 cwt. in 1937. Imports and exports have shown little change on balance, and consumption is estimated at 80,815 cwt. against 59,991 cwt. In 1933 the half-yearly consumption was only 16,400 cwt.

AN ITALIAN-NETHERLANDS GROUP consisting of Antonio Ferretti, Snia Viscosa, Lyemph and Leo de Winter and Co., has founded the Hollandsche Industriële Maatschappij Voor Case Inebereiding Himca Amsterdam for the production of textile casein and wool material from milk. In the northern part of the Netherlands, four factories are already producing textile casein, while plans for the erection of a "Lanital" factory are already much advanced.

PHENOL (SYNTHETIC), acid carboic (synthetic), and benzo-phenol (synthetic) have been exempted from Key Industry Duty imposed by Section 1 of the Safeguarding of Industries Act, 1921, as amended by the Finance Act, 1926. The exemption became operative in respect of goods entered with the Customs or delivered from bonded warehouse, as the case may be, on and after July 7, and remains in force for a period ending on December 31, 1973.

C. L. BURDICK MFG. CO., makers of the "Humatagraph" hygrometer, have moved back to London from Stockport, and their head office will, as formerly, be located at 40 Holborn Viaduct, E.C.1. Mr. C. L. Burdick has taken into partnership Mr. J. H. Burgess, and to cope with extended business an improved factory has been fitted out. We understand that the firm has in hand new developments for the production of hygrostatic controls, also instruments for measuring the water-content of substances.

SHORTER PROCESS CO., LTD., of Celtic Works, Savile Street East, Sheffield, 4, are partially closing their works during the week ending August 7, on account of summer holidays. A skeleton staff will be retained to deal with customer's urgent requirements.

BORAN CONSOLIDATED, LTD., announce that their works at Belvedere, Kent, will be closed from August 1 to August 8 inclusive, on the occasion of their employees' annual holiday. It is hoped that customers will anticipate their requirements for that week.

OVER 400 DELEGATES from all parts of Great Britain and Ireland are expected to attend the 26th annual conference of the British Commercial Gas Association in Manchester, September 26-29. The conference will be under the presidency of Councillor W. P. Jackson, chairman of the City of Manchester Gas Committee, and president of the B.C.G.A.

SEVERAL CONTAINERS OF CHEMICALS EXPLODED in the boiling room at the works of Fredk. Boehm, Ltd., High Street, Plaistow, on July 20, and highly inflammable spirit burst into flames. Workmen on the night shift tried to get the fire under control, but were driven out by the heat and had to call the West Ham Fire Brigade. Trams and trolley buses were delayed for nearly half-an-hour while firemen fought the blaze.

THREE MILLION ACRES OF OIL LANDS in the State of Vera Cruz, Mexico, formerly the holdings of the Mexican Eagle Co., have been taken over by the Mexican Government and incorporated in the national reserves, according to a Presidential Decree published in the "Diario Oficial." The concession was declared null in 1935, but the actual incorporation in the national reserves was not officially published until now.

THE BRITISH COLOUR COUNCIL will show fashion colour schemes for autumn and winter ensembles at 28 Sackville Street, W.1, on July 28.

AT THE INTERNATIONAL COMMERCIAL FAIR, to be held at Smyrna (Izmir), Turkey, August 20 to September 20, there will be an inquiry bureau under the direction of the Consul-General at Smyrna, for the purpose of providing information regarding United Kingdom trade matters.

PROPOSALS TO PREVENT UNDUE FLUCTUATIONS in the price of tin were discussed at this week's meeting of the sub-committee of the International Tin Committee. The suggestion that a "buffer" pool should be adopted found considerable support, and the committee feels that some additional form of price control is necessary.

THE POLICY OF THE INTERNATIONAL RUBBER COMMITTEE has been, and always will be, to give both producers and consumers a square deal, said Sir John Campbell, chairman of the Committee, at the annual meeting and luncheon of the Research Association of British Rubber Manufacturers on July 21. Sir John emphasised that there is an elaborate system in existence for determining the production costs of growers and that the Committee, in consequence, has a clear idea of what is implied by the phrase "reasonably remunerative price."

Books Received

Elementary Physical Chemistry. By Hugh S. Taylor and H. Austin Taylor. Second edition. Pp. 664. London: Macmillan and Co., Ltd. 16s.

Chemical Notes from Foreign Sources

Germany

A FUSION IS ANNOUNCED between the Schering-Kahlbaum concern and the Kokswerke and Chemische Fabriken A.G.

Jugoslavia

RICH PHOSPHATE DEPOSITS are reported to have been discovered in the district of Poljice, exploitation of which is being considered by a number of foreign concerns.

Czechoslovakia

THE ERECTION OF A SYNTHETIC PETROL FACTORY to cover 15 per cent. of the home demand has been commenced at Krickerhau in Central Slovakia. The construction of a second factory at Novaky in the same region is also contemplated and will eventually employ 300 workers.

Poland

THE RUBBER AND EBONITE WORKS "FERROGUMIT" has been formed at Lodz, with a capital of 40,000 zloty, and will engage in the rubber lining of tubes, rollers, etc. and in the manufacture of various types of rubber products.

A PLANT FOR THE PRODUCTION OF NITROGEN COMPOUNDS by the Fauser process has been built by the Soc. Carbochemia, at Wry, with an annual production capacity of 6,000 tons nitrogen. Hydrogen for the process will be produced from water gas.

Japan

WITH THE OBJECT OF PRODUCING PETROLEUM in the province of Akita, the Tohoku Petroleum Co. has been formed with a capital of 2 million yen.

A NEW PROCESS FOR MAKING SYNTHETIC RESIN from waste products of the silk industry is to be exploited by the Tanaka Kagaku Kogyo K.K. To finance this and other developments the company's capital will be increased to 3 million yen.

EBONITE MANUFACTURE WILL BE UNDERTAKEN by the Tokio Ebonit K.K., recently registered with a capital of 200,000 yen. The factory will be located in Tokio-Mikawajima.

AMMONIUM SULPHATE MANUFACTURE has been commenced in a new factory of the Taki Fertiliser Works.

IN VIEW OF THE INCREASING DEMAND for urea-formaldehyde resins, the Oriental Synthetic Chemical Industry Co. has decided to double its present monthly output of 5 tons.

France

REPLACEMENT OF PARA-PHENYLENE DIAMINE, as a photographic developer, by the ortho-compound is reported by A. Seyewitz (*Bull. Soc. Franc. Phot.*, 23, 159) to result in several advantages. It does not blacken the fingers and development at almost the same speed is possible without diminution of gamma or of contrast by reducing the proportion of bromide.

Sweden

A LARGE CELLULOSE FACTORY IS TO BE ERECTED near the Bergviks Sulfatfabrik at Sandarna by the Svenska Cellulosa A/B.

THE POSSIBILITIES OF SWEDISH APATITE as a raw material for phosphate fertilisers are being investigated. At present about 20,000 tons of apatite concentrates are being imported annually by Swedish superphosphate factories. The investigations are being financially supported by the Government, which has voted 300,000 kronen in all for development of the fertiliser industry.

Italy

A NEW REACTION FOR ALDEHYDES, discovered by C. Ottolino (*Farm. Ital.*, 1926, 4, 195), is based upon the development of coloured products when condensed in an oxidising medium with phenyl hydrazine or its homologues. Thus, benzaldehyde treated with methyl phenyl hydrazine yields a compound which, when hydrolysed with boiling 5 per cent. sulphuric acid, yields a dihydrazine. The sulphuric acid solution of this substance has a red colour. The reaction is useful for distinguishing between aldehydes and ketones as the change in colour is not developed with ketones.

Russia

A RUBBER-LIKE PRODUCT HAS BEEN OBTAINED by Krause and co-workers (*Sintet. Kaoutchouk*, 5 (7-8) 3) by polymerisation of piperylene. A viscous mass closely resembling rubber is obtained by polymerisation in presence of sodium, a process proceeding rapidly at about 60°C. The product is finally purified with alcohol. Variations in physical properties are obtained with the aid of other catalysts. Using tin tetrachloride and aluminium chloride, the product is a solid or a soft rubbery mass according to the quantity of catalyst used and the conditions of treatment.

Inventions in the Chemical Industry

THE following information is prepared from the Official Patents Journal. Printed copies of Specifications accepted may be obtained from the Patent Office, 25 Southampton Buildings, London, W.C.2, at 1s. each. The numbers given under "Applications for Patents" are for reference in all correspondence up to the acceptance of the Complete Specification.

Applications for Patents

- HEAT TREATMENT OF ARTICLES.—Imperial Chemical Industries, Ltd. 17797.
- COMBATING OF FUNGIC ATTACK ON VEGETABLE PRODUCTS.—Imperial Chemical Industries, Ltd. 18004.
- MANUFACTURE OF SYNTHETIC RESINS.—Imperial Chemical Industries, Ltd. 18005.
- FEEDING-MECHANISM FOR FURNACES, ETC.—Imperial Chemical Industries, Ltd. 18006.
- MANUFACTURE OF INSECTICIDAL COMPOSITIONS.—Imperial Chemical Industries, Ltd. 18240.
- CONTROL OF AGRICULTURAL, ETC., PESTS.—Imperial Chemical Industries, Ltd. 18242.
- MANUFACTURE OF INTERPOLYMERISATION PRODUCTS.—G. W. Johnson (I. G. Farbenindustrie.) 17601, 17602.
- MANUFACTURE OF COMPOUNDS OF THE ANTHRAQUINONE SERIES.—G. W. Johnson (I. G. Farbenindustrie.) 17746.
- REMOVAL OF ASH FROM LIQUID SUBSTANCES CONTAINING CARBON.—G. W. Johnson (I. G. Farbenindustrie.) 17748.
- MEANS FOR RETARDING THE OXIDATION OF SUBSTANCES SENSITIVE TO OXIDATION.—G. W. Johnson (I. G. Farbenindustrie.) 17944.
- MANUFACTURE OF HIGH QUALITY SICCATIVES.—G. W. Johnson (I. G. Farbenindustrie.) 18069.
- DEVICES FOR MEASURING THE RATE OF CONSUMPTION OF OXYGEN.—H. M. Jones. 18061.
- ISOMERISATION, ETC., OF HYDROXY-KETO-COMPOUNDS HAVING A CYCLOPENTANO-POLYHYDRO-PHENANTHRENE SKELETON.—Naamlooze Vennootschap Organon. (Holland, June 27, '36.) 17888.
- CATALYTIC HYDROGENATION OF CARBONACEOUS MATERIALS.—H. E. Potts (International Hydrogenation Patents Co.). 17821.
- LOW TEMPERATURE DISTILLATION OF FUELS.—Soc. Chimique de la Grande Paroisse Azote et Produits Chimiques. (France, June 30, '36.) 17632.
- LOW TEMPERATURE DISTILLATION OF FUELS.—Soc. Chimique de la Grande Paroisse Azote et Produits Chimiques. (France, May 29.) 17633.
- MANUFACTURE OF INDIGOID VAT DYE STUFFS.—Soc. of Chemical Industry in Basle. (Switzerland, June 26, '36.) 17595.
- MANUFACTURE OF VAT DYE STUFFS.—Soc. of Chemical Industry in Basle. (Switzerland, July 9, '36.) 18178.
- TREATMENT OF CELLULOSE DERIVATIVES.—H. P. Staudinger. 17804.
- PROCESSES FOR DYING ANODIC OXIDISED COATING OF ALUMINIUM, ETC.—Y. Yasoshima. 17719.
- RUST-PREVENTING OIL PAINT.—E. Widugier. 18581.
- CAPILLARY-ACTIVE AGENTS.—A. Carpmal (I. G. Farbenindustrie.) 19027.
- MANUFACTURE OF WATER-INSOLUBLE AZO DYE STUFFS.—A. Carpmal (I. G. Farbenindustrie.) 19424.
- MANUFACTURE OF AZO DYE STUFFS.—A. Carpmal (I. G. Farbenindustrie.) 19546.
- MANUFACTURE OF SUBSTITUTION PRODUCTS OF CYCLIC AMIDINES.—A. Carpmal (I. G. Farbenindustrie.) 19547.
- MANUFACTURE OF WETTING AGENTS.—A. Carpmal (I. G. Farbenindustrie.) 18548.
- PRODUCTION OF NUCLEOSIDES.—C. E. Every-Clayton. (Dr. G. Henning Chemische Pharmaceutische Werk Ges.). 19004.
- EXTRACTION OF OIL FROM SEEDS, ETC.—Compagnie de Produits Chimiques et Electrometallurgiques Alais, Froges, et Camargue. 18999.
- MANUFACTURE OF RESIN-LIKE PRODUCTS.—Deutsche Hydrierwerke A.-G. (Germany, July 7, '36.) 18341.
- MANUFACTURE OF CATALYTIC MATERIALS.—E. I. du Pont de Nemours and Co. 19100.
- MANUFACTURE OF ORGANIC CARBOXYLIC ACIDS AND ESTERS.—E. I. du Pont de Nemours and Co. (United States, July 14, '36.) 19320.
- REFINING OF OILS.—Edeleanu Ges. (Germany, July 9, '36.) 18997.
- PREPARATION OF IMIDINES, ETC.—H. D. Elkington (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). 19046.
- MANUFACTURE OF SOAP.—G. A. Frampton. 19438.
- PREPARATION OF CATALYSTS.—Gas Light and Coke Co., and R. H. Griffith. 19422.
- MANUFACTURE OF EMULSIONS OF HIGHLY POLYMERIC SUBSTANCES.—W. W. Groves (Deutsche Celluloid Fabrik). 19519.
- MANUFACTURE OF WATER-SOLUBLE MONOAZO DYE STUFFS.—W. W. Groves (I. G. Farbenindustrie.) 19269.
- MANUFACTURE OF WATER-SOLUBLE AZO DYE STUFFS.—W. W. Groves (I. G. Farbenindustrie.) 19270.
- SPINNING OF HIGHLY VISCOUS CELLULOSE SOLUTIONS.—W. W. Groves (I. G. Farbenindustrie.) 19522.
- MANUFACTURE OF VISCOUS MASSES FOR COATING COMPOSITIONS.—Imperial Chemical Industries, Ltd., and A. Hill. 19447.
- MANUFACTURE OF AZO DYE STUFFS.—Imperial Chemical Industries, Ltd., and W. H. Cliff. 19571.
- RECOVERY OF HYDROGEN CHLORIDE FROM LIQUIDS CONTAINING HYDROCHLORIC ACID.—G. W. Johnson (I. G. Farbenindustrie.) 19392.
- MANUFACTURE OF CHROME YELLOW.—G. W. Johnson (I. G. Farbenindustrie.) 19097.
- MANUFACTURE OF ORGANIC BODY COLOURS.—G. W. Johnson (I. G. Farbenindustrie.) 19312.
- IMPROVEMENT OF MOTOR-FUELS.—G. W. Johnson (I. G. Farbenindustrie.) 19391.
- PHOSPHATE GLASS.—G. W. Johnson (I. G. Farbenindustrie.) 19393.
- MANUFACTURE OF VAT DYE STUFFS.—G. W. Johnson (I. G. Farbenindustrie.) 19394.
- SENSITISING AND HARDENING PHOTOGRAPHIC EMULSIONS.—Kodak, Ltd. (United States, July 10, '36.) 19172.
- MANUFACTURE OF CELLULOSE DERIVATIVES, ETC.—L. Lilienfeld. 19271, 19272.
- PRESERVATION, ETC., OF EGG-WHITES.—C. H. McCharles and G. Mouchiroud. 19380.
- MANUFACTURE OF CATALYTIC MATERIALS.—C. J. Marvin. 19100.
- PRODUCTION OF NITROGEN-CONTAINING DYE STUFFS.—Montecatini Soc. Generale per l'Industria Mineraria ed Agricola. (Italy, July 17, '36.) 19445.
- PRODUCTION OF PAINTS, ETC.—E. Nagelstein. (Germany, July 14, '36.) 19572.
- PRODUCTION OF SWELLING SUBSTANCES FOR THERAPEUTIC APPLICATION.—Norgine Pharmaceutical Products (London), Ltd. (Germany, July 11, '36.) 19001.
- SYNTHETIC RESIN COMPOSITIONS.—Pinchin, Johnson and Co., Ltd. 19035, 19036.
- OIL-MODIFIED ALKYD RESINS.—Pinchin, Johnson and Co., Ltd. 19037.
- TREATMENT OF ORGANIC MATTER BY FERMENTATION.—D. M. Proctor. 19196.
- CATALYTIC CONVERSION OF MIXTURES OF CARBON MONOXIDE AND HYDROGEN.—Ruhchemie A.-G. (Germany, July 27, '36.) 19431.
- SYNTHETIC RESIN COMPOSITIONS.—S. L. M. Saunders. 19035, 19036.
- OIL-MODIFIED ALKYD RESINS.—S. L. M. Saunders. 19037.
- MANUFACTURE OF POLYHYDRIC ALCOHOLS OF THE CYCLOPENTANO-POLYHYDROPHENANTHRENE SERIES.—Schering-Kahlbaum A.-G. (Germany, July 14, '36.) 19427.
- MANUFACTURE OF POLYHYDRIC ALCOHOLS OF THE CYCLOPENTANO-POLYHYDROPHENANTHRENE SERIES.—Schering-Kahlbaum A.-G. (Germany, July 14, '36.) 19428.
- MANUFACTURE OF POLYHYDRIC ALCOHOLS OF THE CYCLOPENTANO-POLYHYDROPHENANTHRENE SERIES.—Schering-Kahlbaum A.-G. (Germany, Aug. 10, '36.) 19429.
- MANUFACTURE OF OXIDATION DYE STUFFS.—Soc. Anon. des Matieres Colorantes et Produits Chimiques de St. Denis and R. Lantz. (France, July 15, '36.) 18998.

Specifications Open to Public Inspection

- METHODS AND APPARATUS FOR MEASURING ION CONCENTRATION.—G. Kent, Ltd. Jan. 11, 1936. 18765/36.
- MANUFACTURE OF VOLATILISED PRODUCTS FROM MINERAL OILS.—Standard Oil Development Co. Jan. 11, 1936. 31107/36.
- PROCESS FOR THE ELECTRO-THERMIC PRODUCTION OF MAGNESIUM.—American Magnesium Metals Corporation. Jan. 10, 1936. 33540/36.
- PREPARATION OF CELLULOSE XANTHATE SOLUTION.—Brown Co. Jan. 10, 1936. 33945/36.
- PRODUCTION OF OLEFINE ETHERS.—Carbide and Carbon Chemicals Corporation. Jan. 7, 1936. 34365/36.
- PROCESS FOR THE POLYMERISATION OF TRICHLOROETHYLENE.—Consortium Fur Elektro-Chemische Industrie Ges. Jan. 6, 1936. 35107/36.
- PRODUCTION OF DYE STUFF PIGMENT PASTES.—I. G. Farbenindustrie. Jan. 6, 1936. 35161/36.
- MANUFACTURE AND PRODUCTION OF CROTONALDEHYDE.—I. G. Farbenindustrie. Jan. 7, 1936. 35756/36.
- MELTING AND REFINING OF MAGNESIUM AND ITS ALLOYS.—Soc. de Produits Chimiques des Terres Rares. Jan. 6, 1936. 35852/36.
- GERMICIDAL PREPARATIONS.—Lehn and Fink Products Corporation. Jan. 8, 1936. 122/37.
- SULFONIC ACIDS, INSOLUBLE AZO-DYE STUFFS DERIVED FROM THESE ACIDS, AND PROCESSES FOR THEIR PREPARATION.—Soc. Anon. des Matieres Colorantes et Produits Chimiques de St. Denis, A. Wahl, and M. Paillard. Jan. 6, 1936. 386/37.
- PARASITICIDAL COMPOSITIONS AND THEIR MANUFACTURE.—E. I. du Pont de Nemours and Co. Jan. 6, 1936. 431-3/37.
- APPARATUS FOR CONTINUOUSLY CRYSTALLISING SOLUTIONS.—N. V. Werkspoor. Jan. 11, 1936.
- METHODS AND APPARATUS FOR FORMING FILMS OF SYNTHETIC RESIN.—H. Bieuville. Jan. 7, 1936. 533/37.

MANUFACTURE OF MEDICINAL DEPOTS, masses for infusion, stiffening agents, plastic fillings, and the like.—Chemische Forschungsges. Jan. 8, 1936. 505/37.

RESINOUS CONDENSATION PRODUCTS.—E. I. du Pont de Nemours and Co. Jan. 7, 1936. 545/37.

WETTING AND PENETRATING AGENTS for strong alkali lyes.—Chemical Works, Formerly Sandoz. Jan. 9, 1936. 636/37.

MANUFACTURE OF POLYAZO DYESTUFFS.—Soc. of Chemical Industry in Basle. Jan. 9, 1936. 791/37.

MANUFACTURE OF POLYAZO DYESTUFFS.—Soc. of Chemical Industry in Basle. Jan. 9, 1936. 793/37.

MANUFACTURE OF DYESTUFFS of the anthraquinone series.—Soc. of Chemical Industry in Basle. Jan. 10, 1936. 797/37.

MANUFACTURE OF TRIAZOLIDINE DERIVATIVES.—I. G. Farbenindustrie. (Divided out of 15970-1/36.) 800/37.

PROCESS FOR MAKING CARBON BLACK, which is poor in impurities, and hydrogen or hydrogen-containing gases.—Bayerische Stickstoffwerke, A.-G. Jan. 9, 1936. 836/37.

PURIFYING AND CONCENTRATING CAOUTCHOUC DISPERSIONS or the like.—Semperit Oesterreichisch-Amerikanische Gummiwerke, A.-G. Jan. 11, 1936. 867/37.

Specifications Accepted with Date of Application

MANUFACTURE OF ALDEHYDE CONDENSATION PRODUCTS.—A. G. Bloxam (Soc. of Chemical Industry in Basle). Oct. 8, 1935. 468,677.

METHOD FOR PURIFICATION OF ANTITOXINS and the like.—I. A. Parfentjev. Oct. 9, 1934. 468,676.

TREATMENT OF CARBONACEOUS MATERIALS.—F. Uhde. Oct. 31, 1934. 468,680.

PRODUCTION OF DERIVATIVES of barbituric acid.—A. A. Thornton (Chemische Fabriken Dr. J. Wiernik and Co., A.-G.). Nov. 1, 1935. 468,503.

PRODUCTION OF SYNTHETIC RESINS from phenols and formaldehyde.—I. Rosenblum. Nov. 3, 1934. 468,681.

APPARATUS FOR THE CONVERSION OF OXIDES of carbon with hydrogen.—G. W. Johnson (I. G. Farbenindustrie.) Nov. 29, 1935. 468,434.

TREATMENT OF POLYMERISED CHLOROPRENE.—Boston Blacking Co., Ltd. Dec. 3, 1934. 468,435.

PROCESS FOR THE MANUFACTURE OF THEOBARBITURIC ACID COMPOUNDS.—A. Carpmal (I. G. Farbenindustrie.) Dec. 3, 1935. 468,683.

MANUFACTURE AND PRODUCTION OF VAT DYESTUFFS of the anthraquinone series.—G. W. Johnson (I. G. Farbenindustrie.) Dec. 6, 1935. 468,686.

MANUFACTURE OF VAT-DYESTUFFS.—I. G. Farbenindustrie. Jan. 12, 1935. 468,627.

MANUFACTURE OF FLUORINE DERIVATIVES of aliphatic hydrocarbons.—F. D. Leicester, and Imperial Chemical Industries, Ltd. Jan. 3, 1936. 468,447.

CONVERSION OF HYDROCARBON OILS.—Universal Oil Products Co. June 24, 1935. 468,741.

RESIN SIZE.—Paper Makers Chemical Corporation. Feb. 27, 1935. 468,450.

MANUFACTURE OF POLYMERISED 2-CHLORO-1:3-BUTADIENE.—E. I. du Pont de Nemours and Co., W. H. Carothers, A. M. Collins, and J. E. Kirby. Jan. 6, 1936. 468,693.

PROCESS AND APPARATUS FOR SPLITTING UP A LIQUID MIXTURE into its components or groups of components.—H. D. Elkington (Naamlooze Vennootschap de Bataafsche Petroleum Maatschappij). Jan. 6, 1936. 468,695.

PRODUCTION OF COLOURED RESISTS under aniline black by means of ester salts of leuco-vat-dyestuffs.—W. W. Groves (Durand and Huguenin, A.-G.). Jan. 7, 1936. 468,751.

PROCESS FOR SIMULTANEOUSLY OBTAINING PEROXIDES of alkali or earth alkali metals and valuable compounds of said metals.—I. G. Farbenindustrie. Jan. 7, 1936. 468,697.

PROCESS FOR WASHING INDUSTRIAL GASES, such as coal gas.—Ruhrchemie, A.-G. Jan. 11, 1935. 468,754.

MANUFACTURE OF CARBOCYANINE DYESTUFFS for sensitising photograph emulsions.—Gevaert Photo Producten, N.V. Jan. 8, 1935. 468,755.

PURIFICATION OF ALKALI METAL HYDROXIDE SOLUTIONS.—A. Carpmal (I. G. Farbenindustrie.) Jan. 8, 1936. 468,637.

EXTRACTION OF VOLATILE HYDROCARBONS from solid or high boiling point liquid hydrocarbons.—N. H. Freeman. Jan. 9, 1936. 468,707.

MANUFACTURE OF HETEROCYCLIC CONDENSATION PRODUCTS.—A. Carpmal (I. G. Farbenindustrie.) Jan. 13, 1936. 468,640.

MANUFACTURE OF VAT-DYESTUFFS and intermediates.—A. G. Bloxam (Soc. of Chemical Industry in Basle.) Feb. 14, 1935. 468,648.

MANUFACTURE OF ADHESIVE COMPOSITIONS.—Distillers, Ltd., and P. D. Coppock. March 31, 1936. 468,582.

APPARATUS FOR BRINGING LIQUIDS AND GASES or vapours into intimate contact.—P. Madsen. April 8, 1935. 468,654.

PRODUCTION OF IONISED GAS such as air.—A. H. Stevens (General Patents, Ltd.). April 9, 1936. 468,655.

VULCANISATION OF RUBBER.—Wingfoot Corporation. Oct. 2, 1935. 468,658.

APPARATUS FOR THE THERMAL CONVERSION OF HYDROCARBONS into valuable products.—Ruhrchemie, A.-G. March 18, 1935. 468,729.

MANUFACTURE AND PRODUCTION OF CHROMITE REFRACTORIES.—G. E. Seil. Oct. 10, 1935. 468,659.

PYROLYTIC REFORMING OF MOTOR FUELS.—Standard Oil Development Co. Dec. 17, 1935. 468,488.

MANUFACTURE OF MONOAZO DYESTUFFS.—I. G. Farbenindustrie. Oct. 22, 1935. 468,597.

PRODUCTION OF DERIVATIVES of barbituric acid.—A. A. Thornton (Chemische Fabriken Dr. J. Wiernik and Co., A.-G.). Nov. 1, 1935. 468,555.

PRODUCTION OF CELLULOSE from vegetable raw material.—H. A. Knopf. Dec. 30, 1935. 468,669.

PROCESS FOR SEPARATING ACETYLENE from mixtures with ethylene and ethane.—Ges. Fur Linde's Eismaschinen, A.-G. Jan. 11, 1936. 468,614.

MANUFACTURE OF ALDEHYDE CONDENSATION PRODUCTS.—A. G. Bloxam (Soc. of Chemical Industry in Basle). Oct. 8, 1935. 468,746.

Chemical and Allied Stocks and Shares

DESPITE the commencement of a new Stock Exchange account on Monday, inactive and moderately reactionary conditions have continued in the industrial and other sections of the Stock Exchange. Nevertheless shares of chemical and allied companies showed various individual features of interest. Imperial Chemical at 37s. 6d. have more than held last week's rise, hopes of a small increase in the dividend and of a possible raising of the total payment for the year to 9 per cent. having continued to be entertained by some market men. It is also being pointed out that there are probably few other companies which would benefit to a greater extent when there is real recovery in international trade. Distillers have lost 1s. to 108s. 9d., but were reported to be fairly steady, the statements at the recent meeting having drawn attention to the widespread interests of the company.

British Plaster Board were lower at 35s. 9d. as were Associated Portland Cement at 90s. 7½d., most shares of companies with connections in the building and allied trades having been affected by indications of reduced activity in the latter. The statements at this week's meeting of Eastwoods Cement have, however, increased the belief that demand for cement is likely to expand for some time to come. The market is budgeting for the maintenance of the interim dividend of Associated Portland Cement, and the general view is that there seem reasonable possibilities of the total for the year again being brought up to 22½ per cent. Turner and Newall held last week's improvement to 91s. 3d. Borax Consolidated gained 7½d. to 30s. 7½d. on the hope that payment of an interim dividend may be resumed in the autumn and General Refractories were reported to be rather more active, although as compared with a week ago the price has

lost 3d. to 28s. at the time of writing. The last-named company is expected to declare its interim dividend next month.

There was again increased activity in shares with an international market. Unilever are 40s. 3d., and Unilever N.V. 42s. 9d., while Swedish Match are 25s. 1½d. International Nickel have risen further from \$62½ to \$64½ at the time of writing, the market now being hopeful that the upward movement in profits continued in the past quarter.

Chloride Electrical Storage have been more active around 79s. They offer only a moderate yield, but this is explained by the strong balance sheet position which is said to indicate the possibility of a bonus sooner or later. Fison, Packard and Prentice changed hands at 39s. B. Laporte were higher, business being recorded around 105s. Bennis Combustion transferred around 7s. 3d. interest in these 5s. shares having increased as a result of the good impression created by the statements at the meeting. International Combustion changed hands around 121s. 3d. British Tar Products 5s. shares were reported to be somewhat more active. In recent years the shares have been on a 15 per cent. dividend basis and they offer an apparently attractive yield, but are not always an active market. Monsanto Chemical 5½ per cent. preference shares showed more "markings" of business and transferred around 23s. 3d. British Oil and Cake Mills preferred ordinary were fairly steady at 47s. 9d.

Boots Pure Drug were higher at 51s. 9d., a gain of 9d. on the week. Beechams Pills deferred shares were again prominently active on expectations of an increase in the interim dividend, but best prices were not held. Sangers were 26s. 1½d., or practically the same as a week ago. Timothy Whites and Taylors at 32s. 1½d. were also virtually maintained.

Weekly Prices of British Chemical Products

THESE are no price changes to report in the London market for wood distillation products, tar products, perfumery chemicals, essential oils and intermediates. Unless otherwise stated the prices below cover fair quantities net and naked at sellers' works.

MANCHESTER.—Generally steady price conditions have been reported on the Manchester chemical market during the past week, especially in respect of the heavy products. To an increasing extent deliveries against contracts are being adversely affected by the holidays and this seasonal influence is likely to continue for another five or six weeks. Otherwise, there is an active consumption of textile and other chemicals in Lancashire and the West Yorkshire areas. Most of the important users in these districts are well covered for supplies over the second half of the year and consequently new business is only on a relatively moderate scale. The tar products are mostly steady,

though a feature in this section has been a slowing down of the demand for carbolic acid and a reaction in prices of both crude and crystals after the recent sharp upward movement.

GLASGOW.—There has been a steady day to day demand for chemicals for home trade during the week, and rather more inquiry for export. Prices generally continue steady with few changes to report. The coal tar products market has been very quiet throughout the week, a condition accentuated by the fact that most local production units have been at rest during the Glasgow Fair holiday; certain grades of cresylic acid have been on offer at reduced rates, but in the absence of definite reports of fresh transactions, prices remain unaltered. The demand for carbolic acid continues in excess of the supply. Creosote remains steady, and the distribution of benzols and naphthas to consumers has been regular although manufacture is temporarily slowed down.

General Chemicals

ACETONE.—£45 to £47 per ton.

ACID, ACETIC.—Tech., 80%, £30 5s. to £32 5s. per ton; pure 80%, £30 5s.; tech., 40%, £15 12s. 6d. to £18 12s. 6d.; tech., 60%, £23 10s. to £25 10s. MANCHESTER: 80%, commercial, £30 5s.; tech. glacial, £42 to £46.

ACID, BORIC.—Commercial granulated, £28 10s. per ton; crystal, £29 10s.; powdered, £30 10s.; extra finely powdered, £32 10s. in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Crystals, £29 10s.; powdered, £30 10s. 1-cwt. bags in 1-ton lots.

ACID, CHROMIC.—9½d. per lb., less 2½%; d/d U.K.

ACID, CITRIC.—1s. per lb. MANCHESTER: 1s. SCOTLAND: B.P. crystals, 1s. per lb., less 5%, ex store.

ACID, FORMIC.—85%, in carboys, ton lots, £42 to £47 per ton.

ACID, HYDROCHLORIC.—Spot, 5s. to 7s. 6d. carboy d/d according to purity, strength and locality.

ACID, LACTIC.—LANCASHIRE: Dark tech., 50% by vol., £24 10s. per ton; 50% by weight, £28 10s.; 80% by weight, £50: pale tech., 50% by vol., £28; 50% by weight, £33; 80% by weight, £55; edible, 50% by vol., £41. One-ton lots ex works, barrels free.

ACID, NITRIC.—80° Tw. spot, £18 to £25 per ton makers' works.

ACID, OXALIC.—£48 15s. to £57 10s. per ton, according to packages and position. GLASGOW: £2 9s. per cwt. in casks. MANCHESTER: £49 to £55 per ton ex store.

ACID, SULPHURIC.—168° Tw., £4 5s. to £4 15s. per ton; 140° Tw., arsenic-free, £2 15s. to £3 5s.; 140° Tw., arsenious, £2 10s.

ACID, TARTARIC.—1s. 1½d. per lb. less 5%, carriage paid for lots of 5 cwt. and upwards. MANCHESTER: 1s. 1½d. per lb. GLASGOW: 1s. 1d. per lb.

ALUM.—Loose lump, £8 7s. 6d. per ton d/d; GLASGOW: Ground, £10 7s. 6d. per ton; lump, £9 17s. 6d.

ALUMINIUM SULPHATE.—£7 per ton d/d Lancs.; GLASGOW: £7 to £8 ex store.

AMMONIA, ANHYDROUS.—Spot, 10d. per lb. d/d in cylinders. SCOTLAND: 10d. to 1s. containers extra and returnable.

AMMONIA, LIQUID.—SCOTLAND: 80°, 2½d. to 3d. per lb., d/d.

AMMONIUM BICHROMATE.—8d. per lb. d/d U.K.

AMMONIUM CARBONATE.—£20 per ton d/d in 5 cwt. casks.

AMMONIUM CHLORIDE.—LONDON: Fine white crystals, £16 10s. (See also Sal ammoniac.)

AMMONIUM CHLORIDE (MURIATE).—SCOTLAND: British dog tooth crystals, £32 to £35 per ton carriage paid according to quantity. (See also Sal ammoniac.)

ANTIMONY OXIDE.—£55 10s. per ton.

ARSENIC.—LONDON: £13 10s. per ton c.i.f. main U.K. ports for imported material; Cornish nominal, £22 10s. f.o.r. mines. SCOTLAND: White powdered, £17 ex store. MANCHESTER: White powdered Cornish, £17, ex store.

BARIUM CHLORIDE.—£10 per ton. GLASGOW: £11 5s. per ton.

BISULPHITE OF LIME.—£6 10s. per ton f.o.r. London.

BLEACHING POWDER.—Spot, 35/37%. £8 15s. per ton in casks, special terms for contracts. SCOTLAND: £9 per ton net ex store.

BORAX COMMERCIAL.—Granulated, £16 per ton; crystal, £17; powdered, £17 10s.; extra finely powdered, £18 10s., packed in 1-cwt. bags, carriage paid home to buyers' premises within the United Kingdom in 1-ton lots. GLASGOW: Granulated, £16, crystal, £17; powdered, £17 10s. per ton in 1-cwt. bags, carriage paid.

CALCIUM CHLORIDE.—Solid 70/75% spot, £5 5s. per ton d/d station in drums. GLASGOW: 70/75% solid, £5 10s. per ton net ex store.

CHROMETAN.—Crystals, 2½d. per lb.; liquor, £19 10s. per ton d/d

COPPER SULPHATE.—GLASGOW: £24 per ton.

CREAM OF TARTAR.—£3 19s. per cwt. less 2½%. GLASGOW: 99%, £4 12s. per cwt. in 5-cwt. casks.

FORMALDEHYDE.—£22 10s. per ton.

GLYCERINE.—Chemically pure, double distilled, 1.260 s.g. in tins, £5 7s. 6d. to £6 7s. 6d. per cwt. according to quantity; in drums, £5 to £5 13s. 6d.

IODINE.—Resublimed B.P., 5s. 1d. per lb.

LEAD ACETATE.—LONDON: White, £35 10s. per ton; brown, £35.

GLASGOW: White crystals, £34 to £35; brown, £1 per ton less. MANCHESTER: White, £36 10s.; brown, £36.

LEAD NITRATE.—£39 per ton.

LEAD, RED.—SCOTLAND: £38 per ton, less 2½%, carriage paid for 2-ton lots.

LEAD (WHITE SUGAR OF).—GLASGOW: £36 10s. per ton net, ex store.

LITHARGE.—SCOTLAND: Ground, £38 per ton, less 2½%, carriage paid for 2-ton lots.

MAGNESITE.—SCOTLAND: Ground calcined, £9 per ton, ex store.

MAGNESIUM CHLORIDE.—SCOTLAND: £7 10s. per ton.

MAGNESIUM SULPHATE.—Commercial, £5 per ton, ex wharf.

MERCURY.—Ammoniated B.P. (white precip.), lump, 5s. 11d. per lb.; powder B.P., 6s. 1d.; bichloride B.P. (corros. sub.) 5s. 2d.; powder B.P. 4s. 10d.; chloride B.P. (calomel), 5s. 11d.; red oxide cryst. (red precip.), 7s.; levig. 6s. 6d.; yellow oxide B.P. 6s. 4d.; persulphate white B.P.C., 6s. 1d.; sulphide black (hyd. sulph. cum sulph. 50%), 6s. For quantities under 112 lb., 1d. extra.

METHYLATED SPIRIT.—61 O.P. industrial, 1s. 5d. to 2s. per gal.; pyridinised industrial, 1s. 7d. to 2s. 2d.; mineralised, 2s. 6d. to 3s. Spirit 64 O.P. is 1d. more in all cases and the range of prices is according to quantities. SCOTLAND: Industrial 64 O.P., 1s. 9d. to 2s. 4d.

PARAFFIN WAX.—SCOTLAND: 3½d. per lb.

PHENOL.—7½d. to 8½d. per lb.

POTASH, CAUSTIC.—LONDON: £42 per ton. MANCHESTER: £39 10s.

POTASSIUM BICHROMATE.—SCOTLAND: 5d. per lb., net, carriage paid.

POTASSIUM CHLORATE.—£36 7s. 6d. per ton. GLASGOW: 4½d. per lb. MANCHESTER: £38 per ton.

POTASSIUM IODIDE.—B.P. 4s. 3d. per lb.

POTASSIUM NITRATE.—£27 per ton. GLASGOW: Refined granulated, £29 per ton c.i.f. U.K. ports. Spot, £30 per ton ex store.

POTASSIUM PERMANGANATE.—LONDON: 9½d. per lb. SCOTLAND: B.P. Crystals, 9½d. MANCHESTER: B.P. 11d. to 1s.

POTASSIUM PRUSSATE.—6½d. per lb. SCOTLAND: 7d. net, in casks, ex store. MANCHESTER: Yellow, 6½d.

SALAMMONIAC.—First lump spot, £41 17s. 6d. per ton d/d in barrels. GLASGOW: Large crystals, in casks, £37.

SALT CAKE.—Unground, spot, £3 16s. 6d. per ton.

SODA ASH.—58% spot, £5 12s. 6d. per ton f.o.r. in bags.

SODA, CAUSTIC.—Solid, 76/77° spot, £12 10s. per ton d/d station. SCOTLAND: Powdered 98/99%, £17 10s. in drums, £18 5s. in casks, Solid 76/77°, £14 12s. 6d. in drums; 70/73%, £14 12s. 6d., carriage paid buyer's station, minimum 4-ton lots; contracts 10s. per ton less.

SODA CRYSTALS.—Spot, £5 to £5 5s. per ton d/d station or ex depot in 2-cwt. bags.

SODIUM ACETATE.—£18 per ton carriage paid North. GLASGOW: £18 10s. per ton net ex store.

SODIUM BICARBONATE.—Refined spot, £10 10s. per ton d/d station in bags. GLASGOW: £13 per ton in 1 cwt. kegs, £11 per ton in 2-cwt. bags. MANCHESTER: £10 10s.

SODIUM BICHROMATE.—Crystals cake and powder 4d. per lb. net d/d U.K. discount 5%. MANCHESTER: 4d. per lb. GLASGOW: 4d., net, carriage paid.

SODIUM BISULPHITE POWDER.—60/62%, £20 per ton d/d 1 cwt. iron drums for home trade.

SODIUM CARBONATE, MONOHYDRATE.—£15 per ton d/d in minimum ton lots in 2 cwt. free bags.

SODIUM CHLORATE.—£26 10s. to £30 per ton. GLASGOW: £1 10s. per cwt., minimum 3 cwt. lots.

SODIUM CHROMATE.—4d. per lb. d/d U.K.

SODIUM HYPOSULPHATE.—Commercial, 2 ton lots d/d, £10 5s. per ton; photographic, £15. MANCHESTER: Commercial, £10; photographic, £14 10s.

SODIUM METASILICATE.—£14 per ton, d/d U.K. in cwt. bags.
SODIUM NITRATE.—Refined, £7 15s. per ton for 6-ton lots d/d.
SODIUM NITRITE.—£18 5s. per ton for ton lots.
SODIUM PERBORATE.—10%, ½d. per lb. d/d in 1-cwt. drums.
SODIUM PHOSPHATE.—£13 per ton.
SODIUM PRUSSIAN.—4d. per lb. for ton lots. GLASGOW: 5d. to 5½d. ex store. MANCHESTER: 4d. to 4½d.
SODIUM SILICATE.—£9 10s. per ton.
SODIUM SULPHATE (GLAUBER SALTS).—£3 per ton d/d.
SODIUM SULPHATE (SALT CAKE).—Unground spot, £3 12s. 6d. per ton d/d station in bulk. SCOTLAND: Ground quality, £3 5s. per ton d/d. MANCHESTER: £3 15s.
SODIUM SULPHIDE.—Solid 60/62%, Spot, £11 5s. per ton d/d in drums; crystals 30/32%, £8 15s. per ton d/d in casks. MANCHESTER: Concentrated solid, 60/62%, £11; commercial, £9.
SODIUM SULPHITE.—Pea crystals, spot, £13 5s. per ton d/d station in kegs. Commercial spot, £8 15s. d/d station in bags.
SULPHATE OF COPPER.—£20 per ton, less 2%, in casks. MANCHESTER: £22 5s. per ton f.o.b. SCOTLAND: £24 per ton less 5%, Liverpool, in casks.
SULPHUR PRECIP.—B.P., £55 to £60 per ton according to quantity. Commercial, £50 to £55.
ZINC SULPHATE.—Crystals, £9 per ton, f.o.r., in bags.

Rubber Chemicals

ANTIMONY SULPHIDE.—Golden, 6½d. to 1s. 1d. per lb., according to quality. Crimson, 1s. 5½d. to 1s. 7d. per lb., according to quality.
ARSENIC SULPHIDE.—Yellow, 1s. 5d. to 1s. 7d. per lb.
BARYTES.—£6 to £7 10s. per ton, according to quality
CADMIUM SULPHIDE.—7s. 8d. to 7s. 11d. per lb.
CARBON BISULPHIDE.—£31 to £33 per ton, according to quantity, drums extra.
CARBON BLACK.—3 11/16d. to 4 13/16d. per lb., ex wharf.
CARBON TETRACHLORIDE.—£41 to £46 per ton, according to quantity, drums extra.
CHROMIUM OXIDE.—Green, 1s. 2d. per lb.
DIPHENYLQUANIDINE.—2s. 2d. per lb.
INDIA-RUBBER SUBSTITUTES.—White, 4½d. to 5d. per lb.; dark, 3½d. to 4½d. per lb.
LAMP BLACK.—£22 to £23 per ton d/d London; vegetable black, £28 to £48.
LEAD HYPOSULPHITE.—9d. per lb.
LITHOPONE.—30%, £16 10s. to £17 5s. per ton.
SULPHUR.—£9 to £9 5s. per ton. SULPHUR PRECIP. B.P., £55 to £60 per ton. SULPHUR PRECIP. COMM., £50 to £55 per ton.
SULPHUR CHLORIDE.—5d. to 7d. per lb., according to quantity.
VERMILION.—Pale, or deep, 5s. 3d. per lb., 1-cwt. lots.
ZINC SULPHIDE.—10d. to 11d. per lb., according to quality.

Nitrogen Fertilisers

SULPHATE OF AMMONIA.—Neutral quality, basis 20.6 per cent. nitrogen, delivered in 6-ton lots to farmer's nearest station, £7 5s. per ton.
CALCIUM CYANAMIDE.—£7 5s. per ton, carriage paid to any railway station in Great Britain in lots of four tons and over.
NITRO-CHALK.—£7 5s. per ton for delivery to end of July.
NITRATE OF SODA.—£7 12s. 6d. per ton for delivery up to end of July.
CONCENTRATED COMPLETE FERTILISERS.—£10 12s. to £11 1s. per ton delivered in 6-ton lots to farmer's nearest station.
AMMONIUM PHOSPHATE FERTILISERS.—£10 5s. to £13 15s. per ton for delivery up to end of July, delivered in 6-ton lots to farmer's nearest station.

Coal Tar Products

ACID, CRESYLIC.—97/99%, 5s. 3d. to 5s. 6d. per gal.; 99/100%, 5s. to 6s., according to specification; pale 99%, 5s. 6d. to 5s. 8d.; dark, 4s. 8d. to 4s. 10d. GLASGOW: Pale, 99/100%, 5s. to 5s. 6d. per gal.; pale 97/99%, 4s. 6d. to 4s. 10d.; dark, 97/99%, 4s. 3d. to 4s. 6d.; high boiling acids, 2s. 4d. to 2s. 8d. American specification, 4s. 3d. to 4s. 6d. MANCHESTER: Pale, 99/100%, 5s.
ACID, CARBOLIC.—Crystals, 7½d. to 8½d. per lb.; crude, 60's, 4s. 3d. to 4s. 6d. per gal. MANCHESTER: Crystals, 9d. per lb. f.o.b. in drums; crude, 3s. 10d. per gal. GLASGOW: Crude, 60's, 4s. 3d. to 4s. 6d. per gal.; distilled, 60's, 4s. 4d. to 4s. 8d.
BENZOL.—At works, crude, 10d. to 10½d. per gal.; standard motor, 1s. 3½d. to 1s. 4d.; 90%, 1s. 4½d. to 1s. 5d.; pure, 1s. 8½d. to 1s. 9d. GLASGOW: Crude, 10½d. to 10½d. per gal.; motor, 1s. 4½d. to 1s. 5d.
CRESOTENE.—B.S.I. Specification standard, 6d. per gal. f.o.r. Home, 3½d. d/d. LONDON: 4½d. f.o.r. North: 5d. London. MANCHESTER: 5½d. to 6½d. GLASGOW: B.S.I. Specification, 6d. to 6½d. per gal.; washed oil, 5d. to 5½d.; lower sp. gr. oils, 5½d. to 5½d.
NAPHTHA.—Solvent, 90/100%, 1s. 7d. to 1s. 8d. per gal.; 95/100%, 1s. 8d. to 1s. 9d.; 90/190%, 1s. 2d. to 1s. 3d. LONDON: Solvent, 1s. 3½d. to 1s. 4d.; heavy, 11d. to 1s. 0½d. f.o.r. GLASGOW: Crude, 6d. to 6½d. per gal.; 90% 160, 1s. 7d. to 1s. 8d., 90% 190, 1s. 2d. to 1s. 3d.

NAPHTHALENE.—Crude, whizzed or hot pressed, £10 to £11 per ton; purified crystals, £18 to £20 per ton in 2-cwt. bags. LONDON: Fire lighter quality, £5 to £5 10s. per ton; crystals, £27 to £27 10s. GLASGOW: Fire lighter, crude, £6 to £7 per ton (bags free). MANCHESTER: Refined, £21 to £22 per ton f.o.b.

PITCH.—Medium, soft, 38s. per ton, in bulk at makers' works. MANCHESTER: 36s. f.o.b., East Coast. GLASGOW: f.o.b. Glasgow, 35s. to 37s. per ton; in bulk for home trade, 35s.

PYRIDINE.—90/140%, 9s. to 10s. per gal.; 90/180, 2s. 9d. to 3s. 6d. GLASGOW: 90% 140, 9s. to 10s. per gal.; 90% 160, 7s. to 8s.; 90% 180, 2s. 6d. to 3s. MANCHESTER: 9s. to 10s. at works.

TOLUOLE.—90%, 2s. per gal.; pure, 2s. 6d. GLASGOW: 90%, 120, 1s. 11d. to 2s. per gal.

XYLOL.—Commercial, 2s. 3d. per gal.; pure, 2s. 5d. GLASGOW: Commercial, 2s. to 2s. 1d. per gal.

Wood Distillation Products

ACETATE OF LIME.—Brown, £8 5s. to £8 15s. per ton; grey, £10 10s. to £11 10s. Liquor, brown, 30° Tw., 6d. to 8d. per gal. MANCHESTER: Brown, £9 10s.; grey, £11 10s.

CHARCOAL.—£6 5s. to £12 per ton, according to grade and locality.

METHYL ACETONE.—40-50%, £42 to £45 per ton.

WOOD CRESOTENE.—Unrefined 6d. to 1s. per gal., according to boiling range.

WOOD, NAPHTHA, MISCIBLE.—2s. 9d. to 3s. 3d. per gal.; solvent, 3s. 6d. to 3s. 9d. per gal.

WOOD TAR.—£3 to £4 per ton.

Intermediates and Dyes

ACID, BENZOIC, 1914 B.P. (ex toluol).—1s. 9½d. per lb. d/d buyer's works.

ACID, GAMMA.—Spot, 4s. per lb. 100% d/d buyer's works.

ACID, H.—Spot, 2s. 4½d. per lb. 100% d/d buyer's works.

ACID, NAPHTHIONIC.—1s. 8d. per lb.

ACID, NEVILLE AND WINTHER.—Spot, 3s. per lb. 100%.

ACID, SULPHANILIC.—Spot, 8d. per lb. 100%, d/d buyer's works

ANILINE OIL.—Spot, 8d. per lb., drums extra, d/d buyer's works

ANILINE SALTS.—Spot, 8d. per lb. d/d buyer's works, casks free.

BENZIDINE, HCl.—2s. 5d. per lb., 100% as base, in casks.

m-CRESOL 98/100%.—1s. 8d. to 1s. 9d. per lb. in ton lots

o-CRESOL 30/31° C.—6½d. to 7½d. per lb. in 1-ton lots.

p-CRESOL 34.5° C.—1s. 7d. to 1s. 8d. per lb. in ton lots.

DICHLORANILINE.—1s. 11½d. to 2s. 3d. per lb.

DIMETHYLANILINE.—Spot, 1s. 6d. per lb., package extra.

DINITROBENZENE.—7½d. per lb.

DINITROCHLOROBENZENE, SOLID.—£72 per ton.

DINITROTOLUENE.—48/50° C., 8½d. per lb.; 66/68° C., 10d.

DIPHENYLAMINE.—Spot, 2s. per lb., d/d buyer's works.

α-NAPHTHOL.—Spot, 2s. 4d. per lb., d/d buyer's works

β-NAPHTHOL.—9½d. to 9½d. per lb.; flake, 9½d. to 9½d.

α-NAPHTHYLAMINE.—Lumps, 1s. per lb.; ground, 1s. 0½d. in casks.

β-NAPHTHYLAMINE.—Spot, 2s. 9d. per lb., d/d buyer's works in casks.

o-NITRANILINE.—3s. 11d. per lb.

m-NITRANILINE.—Spot, 2s. 7d. per lb., d/d buyer's works.

p-NITRANILINE.—Spot, 1s. 8d. to 2s. 1d. per lb. d/d buyer's works.

NITROBENZENE.—Spot, 4½d. to 5d. per lb., in 90-gal. drums, drums extra.

1-ton lots d/d buyer's works.

NITRONAPHTHALENE.—9d. per lb.; P.G., 1s. 0½d. per lb.

SODIUM NAPHTHIONATE.—Spot, 1s. 9d. per lb., 100% d/d buyer's works.

o-TOLUIDINE.—10½d. per lb., in 8/10-cwt. drums, drums extra.

p-TOLUIDINE.—1s. 10½d. per lb., in casks.

m-XYLIDINE ACETATE.—4s. 3d. per lb., 100%.

Latest Oil Prices

LONDON, July 21.—LINSEED OIL was steady. Spot, £32 10s. per ton (small quantities); Aug., £30; Sept.-Dec., £29 17s. 6d.; Jan.-April, £30; May-Aug., £30 5s., naked. SOYA BEAN OIL was steady. Oriental (bulk), afloat, Rotterdam, £25 15s. per ton. RAPE OIL was quiet. Crude extracted, £37 per ton; technical refined, £38, ex wharf. COTTON OIL was steady. Egyptian crude, £28 per ton; refined common edible, £31 15s.; deodorising, £33 15s., naked, ex mill (small lots £1 10s. extra). TURPENTINE was inactive. American, spot, 37s. per cwt.

HULL.—LINSEED OIL, spot, quoted £30 10s. per ton; July and Aug., £30; Sept.-Dec. and Jan.-April, £29 17s. 6d. COTTON OIL.—Egyptian, crude, spot, £28 per ton; edible refined, spot, £31; technical, spot, £31; deodorised, £33, naked. PALM KERNEL OIL.—F.M.Q., spot, £26 per ton, naked. GROUNDNET OIL, extracted, spot, £32 per ton; deodorised, £35. RAPE OIL, extracted, spot, £36 per ton; refined, £37. SOYA BEAN OIL, extracted, spot, £32 per ton; deodorised, £35. COD OIL.—F.o.r. or f.a.s., 27s. 6d. per cwt., in barrels. CASTOR OIL.—Pharmaceutical, 44s. 6d. per ton; firsts, 39s. 6d.; second, 37s. 6d. TURPENTINE, American, spot, 39s. per cwt.

Company News

Blythe Colour Works.—An interim of 5 per cent. actual, less tax (same) has been announced for the ordinary shares on account of 1937, payable August 4.

Dominion Tar and Chemical.—An interim dividend on the 5½ per cent. preference shares, payable July 31, in respect of quarter ended April 30, 1937, has been announced.

Barrow, Hepburn and Gale.—An interim dividend on the 6 per cent. cumulating participating preference shares for half year ended June 30, 1937, has been announced.

Consolidated Tin Smelters.—A dividend of 6 per cent. on the ordinary shares and the final dividend of 3½ per cent. on the 7 per cent. non-cumulative preference shares have been approved.

Broom and Wade.—A second interim dividend on the ordinary shares of 5 per cent. (nil), has been declared for the purpose of adjusting distribution of current year's profits between holders of old ordinary shares and those just issued.

Eastwoods Cement.—The directors recommend the payment of a final dividend at the rate of 11 per cent., less tax, making a total of 16 per cent. for the year, leaving to be carried forward the sum of £11,977, which compares with £10,381 brought in.

Alpha Cement.—The interim dividend on the increased ordinary capital has been maintained at 5 per cent., less tax. Last year the interim was paid on £830,000 of ordinary capital, and a final of 7 per cent. on £900,000. In addition, a dividend of 1 per cent. was paid on a further £100,000 outstanding.

International Bitumen Emulsions.—The report for the year to March 31 last shows profit, prior to charging British, Dominion and Foreign taxes, £14,881 (£9,658). Provision for taxes absorbs £3,531; after appropriation of £2,600 to depreciation reserve and £1,000 to taxation reserve, and adding £1,324 brought in, there remains £9,074; dividend 5 per cent., less tax (same), £7,747, leaving £1,326 forward. Meeting, Caxton Hall, S.W.1, August 6.

Courtaulds.—A slightly increased interim distribution on the £24,000,000 of ordinary stock has been announced. An interim dividend of 3½ per cent., less tax, will be paid on August 17 next to shareholders on the books on July 14. After deduction of tax at 5s. in the £, shareholders will receive £2 12s. 6d. per cent., which compares with last year's net payment of £2 10s. per cent. Last year's final dividend was 7 per cent., less tax, making a total dividend, with the tax free interim, equal to £10 5s. 7d. per cent., of £7 16s. 9d. per cent., tax free. This compared with 7½ per cent., tax free, in 1935. For 1936 there was a net profit of £2,391,458.

Young Accumulator Co. (1929).—A maiden dividend of 3 per cent., less tax, is announced for the year ended March 31 last. The trading profit for the year is slightly lower at £9,677, against £10,605, and after charging interest and directors' fees and providing for depreciation, the net figure is £952 lower at £5,524. Adding £8,206 brought in and £6,563 from share premium account, there is a total of £20,292, and after allowing for the dividend, writing off £13,434 for underwriting commission, and deducting advertising and research expenditure, £2,504 goes forward. The company's position has been strengthened by research and development work, and by the installation of additional plant.

Griffiths Hughes Proprietaries, Ltd.—This company, which owns the whole of the issued capital of E. Griffiths Hughes, Ltd., makers of Kruschen salts, etc., announces that £170,626 was received in dividends from the operating company in the year to end June last. This compares with £253,354 in the preceding twelve months. Directors' and other fees and general expenses absorbed £4,810, as against £5,389, leaving the amount earned for dividends £82,120 lower at £166,449. A final dividend on the ordinary shares of 6 per cent., making 11 per cent., less tax, compared with 17½ per cent., including a 2½ per cent. bonus, for 1935-36, has been recommended. The balance remaining to go forward is £1,295 higher at £8,065.

Chemical Trade Inquiries

The following trade inquiries are abstracted from the "Board of Trade Journal." Names and addresses may be obtained from the Department of Overseas Trade (Development and Intelligence), 35 Old Queen Street, London, S.W.1 (quote reference number).

South Africa.—H.M. Trade Commissioner at Johannesburg reports that the South African Railways and Harbours Administration is calling for tenders (Tender No. 1403) for the supply and delivery, as and when required during the year ending December 31, 1938, of approximately 6,670 gal. of turpentine, type 1 to B.S. Specification No. 244, and approximately 26,000 gal. of white spirit, type 1 to B.S. Specification No. 245. Tenders, endorsed "Tender No. 1403, Turpentine and White Spirit," should be addressed to the Chief Stores Superintendent, South African Railways and Harbours, Park Station Chambers, Johannesburg, before August 16. (Ref. T. 25285/37.)

Chile.—An agent established at Santiago wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of lithopone, zinc oxide and other raw materials for paint manufacture. (Ref. No. 58.)

Denmark.—An agent established at Copenhagen wishes to obtain the representation, on a commission basis, of United Kingdom manufacturers of synthetic resin, acetone, crude and fine chemicals. (Ref. No. 34.)

Egypt.—The Commercial Counsellor to H.M. Embassy at Cairo, reports that the Physical Department, Ministry of Public Works, Cairo, is calling for tenders for the supply of quantities of scientific instruments. A copy of the schedule of requirements may be inspected at the Department of Overseas Trade.

Commercial Intelligence

The following are taken from printed reports, but we cannot be responsible for any errors that may occur.

BIO-CHEMICAL REMEDIES, LTD., 66 Victoria Street, S.W.1.—Mrs. M. F. R. Naismith, of 17 Cavendish Square, W.1, was appointed receiver on July 7, 1937, under powers contained in debenture dated February 2, 1933.

Mortgages and Charges

(NOTE.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described therein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

BOOTH'S DISTILLERIES, LTD., London, E.C.—July 7. £1,000,000 debenture stock and 6 per cent. premium secured by trust deed dated June 24, 1937; general charge. *£600,000. Aug. 6, 1936.

New Companies Registered

Kylo Preparations, Ltd. (329,641.) Registered July 9. Capital £100 in 100 ordinary shares of £1 each.—To carry on the business of manufacturers of and dealers in soap and all other classes and types of cleansing or scouring materials or preparations, etc. Permanent directors:—Roland F. Berrill, 6 Arundel Court, Churton Street, S.W.1; Charles F. Hayward; and Cecil W. P. Jones.

Burgess Zeolite Co., Ltd. (329,665.) Registered July 10. Capital £10,000 in 10,000 shares of £1. To carry on the business of manufacturers of and dealers in water softening materials and apparatus of all kinds, chemists and chemical engineers, etc. Directors: Eric J. L. Cotton (chairman and managing director), "Beechome," Earl Shilton, Leics., and Jack Dagley.

H. Scholey and Co., Ltd. (329,603.) Registered July 8. Capital £2,100 in 8,000 6 per cent. preferred ordinary shares of 5s. each and 2,000 deferred ordinary shares of 1s. each. To adopt an agreement with Harry Scholey and to carry on the business of manufacturers of and dealers in synthetic resin products and urea powders of all kinds, importers, exporters and manufacturers of and dealers in varnishes, paints, celluloid products, pigments and proprietary articles, colour grinders, dyersalters, etc. Directors: Harry Scholey, 14a Quessens Court, Welwyn Garden City, Herts., and Lawrence A. Worsp.

Flaxyl Products, Ltd. (329,703.) Registered July 12. Capital £3,000 in 3,000 shares of £1 each. To acquire from Cellulose Holdings, Ltd., an exclusive licence for the use in Great Britain, Northern Ireland and the Isle of Man, of certain processes relating to the manufacture and use of cellulose derivatives and artificial materials, and to carry on the business of manufacturers of and dealers in the same and in chemical, industrial and other preparations. Directors: Roger N. Wallach (chairman), Henry G. Brandt, and Geo. B. Hampson. Registered office: 52 Sackville Street, Manchester.

Mercol Products, Ltd. (329,717.) Registered July 12. Capital £1,000 in 1,000 shares of £1 each. To carry on the business of manufacturers of and dealers in chemicals and chemical products of all kinds, etc. Directors: Geo. W. J. Bradley (managing director), Birchill Lodge, Hasland, Chesterfield; Tom Chandler; and Edward H. Rowley. Registered office: 28 Cornish Street, Sheffield, 6.

Inks and Chemicals, Ltd. (329,709.) Registered July 12. Capital £15,000 in 26,000 7½ per cent. cumulative preference shares of 10s. and 40,000 ordinary shares of 1s.—Objects: To carry on the business of producers and manufacturers of and dealers in chemicals and fabrics, chemists, druggists, dyersalters, oil and colourmen, etc. Directors: Francis N. Pickett, 79 New Cavendish Street, W.1; Frederick B. Underwood; and Theodore Whittellsev. Secretary: Ernest H. Ford. Registered office: 3 St. James's Square, S.W.1.

